CPR 4 Schools Evaluation Study Report

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CPR 4 Schools

Evaluation Study Report

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Acknowledgements

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Preface

The Irish Heart Foundation is the national charity fighting heart disease and stroke. We work hard to improve the cardiovascular health of people living in Ireland and to reduce preventable death and disability from heart, stroke and blood vessel diseases.

Every year almost 10,000 lives are lost to cardiovascular disease, making it the country's biggest killer disease, and half of these (5,000) are caused by sudden cardiac arrest, when the heart stops beating. That's 13 sudden deaths every day when a person collapses with a disturbance to their heartbeat.

But there is a way to save many of these lives.

Of those 5,000 deaths, we know that approximately 75% happen in the home, and the majority of these occur in front of a family member or friend. By starting CPR immediately, a bystander can instantly improve the chance of survival. It's a simple skill and it can literally mean the difference between life and death.

In an emergency, nobody knows how they will react. But what we do know is that anyone who has learned CPR is ten times more likely to respond in an emergency than those who have not. With this knowledge in mind, the Irish Heart Foundation decided to embark on a pilot project to teach the simple skill of CPR to Transition Year students, and the campaign became known as CPR 4 Schools.

This unique initiative saw the Irish Heart Foundation distribute 27,500 CPR kits to every Transition Year student in the country – funded entirely by public donations. Each self-training kit contained a DVD, booklet and inflatable manikin, all of which combined to create an easy-to-follow lesson in CPR in just 20 minutes. This programme has run successfully in other countries, and its benefits are well proven.

In choosing a school group, the Irish Heart Foundation recognised the importance of teaching CPR at a young age to instil confidence and knowledge in the lifesaving skill which can be carried into adulthood. Furthermore, by targeting students there was added potential to encourage this group to bring the CPR kits home and teach their families the skills of CPR.

Saving lives is at the heart of our charity's work, and currently the Irish Heart Foundation training network is made up of 180 training sites and over 2,000 CPR instructors. Each year 70,000 people are trained in CPR on average through Irish Heart Foundation sites. Thanks to the CPR 4 Schools pilot project, a further 55,000 people were trained on the kits during a four- to six-week period.

There is no doubt that the CPR 4 Schools project has been a great success, and we are grateful to all who participated in this groundbreaking initiative. The project has clearly shown the undeniable potential to save lives in every community in Ireland by teaching CPR to students in secondary school, and the findings of this report will be presented to the Department of Education.

Michael O'Shea
Chief Executive, Irish Heart Foundation

Executive Summary

CPR 4 Schools is an ambitious training programme developed by the Irish Heart Foundation (IHF) to equip post-primary school students with cardiopulmonary resuscitation (CPR) skills. In the 2008–09 school year, a pilot of the programme was rolled out to 27,000 Transition Year students. The programme is one element of the IHF's strategy to improve survival rates from sudden cardiac arrest, which causes an estimated 5,000 deaths in Ireland every year. Most of these deaths occur at home. If there is a witness, it is most often a relative.

CPR plays a critical role in keeping alive a person who has had a cardiac arrest until they receive defibrillation. However, only a minority of witnesses to a collapse perform CPR because most people lack training in the skill. Increasing the proportion of the population trained in CPR could yield a major public health benefit in numbers of lives saved. By training all children during their school years, CPR can be established as a generic population-wide skill, and by giving the training early in life, the skill can imparted before people develop fears and self-consciousness around the procedure.

The CPR 4 Schools programme adopted an innovative approach to training by using self-instruction kits validated by the American Heart Association. Each kit contains an inflatable mini-manikin, a 22-minute instructional DVD, and a reference booklet. The training is self-directed: instruction on how to perform CPR is provided by the DVD, and students practise the technique on the manikin. Teachers do not need to have any knowledge of CPR. They act as facilitators to the training rather than instructors. Each student is given their own kit and is encouraged to use the kit to train family members and friends.

This study of CPR 4 Schools was conducted to evaluate knowledge and acceptability of CPR among students following training and to assess teachers' experiences of the programme. Students and teachers were surveyed by questionnaire after the training session. One hundred and nine eligible questionnaires were received from teachers (44% response rate), while 319 students from 14 schools submitted eligible questionnaires (69% response rate). Six months later a follow-up survey was conducted among students to evaluate the medium-term effect of the training. Eleven schools returned 272 eligible questionnaires to the follow-up survey (57% response rate).

Teacher Óe5xperiences

- Almost all teachers (97%) responded that the training had gone well, while 90% would definitely run the course in the following year if it were available.

- The main reason for teachers' support of the course – cited by 63% – was the worthwhile learning experience for students. The innovative approach to training was the next most common reason for teachers' positive response to the course, mentioned by 55%. Just over half the teachers endorsed the course because of its success in engaging students. The

merit of transferring the skill to friends and family was acknowledged by 13%, while 8% of respondents found it useful that the course complemented other first aid training students had undertaken.

- The main difficulty – cited by 12% of teachers – was scheduling the course in the Transition Year timetable.

Student knowledge and acceptance of CPR: initial survey

- In the knowledge assessment conducted just after training, students' average score out of 8 was 6.8 (85% of the total mark) and the median score was 7. Full marks were achieved by 37% of students, while another 31% correctly answered 7 questions.

- Over three-quarters (76%) of the students reported that they would be likely to give CPR if they were present when a person collapsed, 19% were unsure, and 5% indicated that they would be unlikely to initiate CPR. A high score on the knowledge test was associated with increased likelihood of giving CPR.

- The vast majority (90%) of students were more confident to perform CPR after training, confidence was unchanged for 9%, and 1% were less confident. A higher CPR knowledge score was weakly associated with increased confidence in ability to perform CPR.

- 68% of students responded that they would show their family and friends how to do CPR, while 21% expressed uncertainty, and 12% responded that they would not.

- Girls performed better than boys on the knowledge test: girls' average score was 7.01, while that of boys was 6.33. Proportionally more girls than boys were willing to respond in an emergency (80 vs 64%), confident to perform CPR (94 vs 78%), and likely to share the kits with family and friends (71 vs 60%).

Student knowledge and acceptance of CPR: followup

- After six months, students' knowledge of CPR had deteriorated. The average score out of 8 was 6 (75% of the total mark) and the median score was 6. The percentage of students that achieved full marks fell to 11%, while one-quarter correctly answered 7 questions.

- The proportion of students reporting that they would be likely to give CPR in an emergency fell to 59%, 30% were unsure, and 10% indicated that they would be unlikely to initiate CPR.

- Levels of confidence to perform CPR in an emergency also declined, but less so: 82% responded that they were more confident having been trained, 14% responded that their confidence was unchanged, and 2% were less confident.

- Ninety-three students (35%) reported that family members or friends had used the kit to learn CPR. An additional 226 people were trained, giving a multiplier effect of almost 1 other person per student trained.

- Of the students who shared the kit, 68% reported that the kit was used by one or both parents, while 67% reported that it was used by one or more siblings, and 22% reported that the kit was used by a friend.
- Awareness of defibrillators in their communities had increased amongst students after six months: 70% of students were aware of the site of a defibrillator, compared with 53% in the initial survey.
- The gap in knowledge scores between girls and boys had narrowed after six months: girls' average score was 6.08, compared with an average score of 5.89 for boys. Likelihood of giving CPR in an emergency declined more among girls, falling to 58% among girls, compared with 61% among boys. However, three-quarters of students who passed the kit to family and friends were girls.

Recommendations

The recommendations are presented in two parts. The first set comprises measures aimed at enhancing the programme, while the second set addresses the programme's broader social aims.

I. Recommendations: Programme improvements

Recommendation 1.1: Develop a comprehensive, multifunctional CPR 4 Schools website.
A website would provide an effective means of automating operational aspects of the programme as well as providing support to teachers and students.

Recommendation 1.2: Improve links with schools.
Stronger relationships should be established with key staff in schools so that CPR training is regarded as a school-wide endeavour. School principals and school secretaries, and the teacher who runs the training, should be involved in programme planning.

Recommendation 1.3: Develop the content of the course to aid knowledge retention and improve motivation and confidence to perform CPR.
The learning experience for students needs to be developed to reinforce the instruction given in the DVD and to address issues of student motivation and confidence.

Recommendation 1.4: Set a specific amount of time for practice by each student.
Practice is a critical element of the training; ensuring that students get enough practice cannot be left to chance. Every student should leave the classroom confident that they can carry out the procedure according to the guidelines they've been taught.

Recommendation 1.5: Provide guidelines for teachers on classroom setup and session duration.
Guidelines will enable teachers to optimise the learning environment and the learning session for all students.

Recommendation 1.6: Build refresher training sessions into the programme.
Retention of knowledge and skills will diminish over time regardless of the quality of the initial training. It is important that the programme be extended to include refresher training sessions after the initial training.

Recommendation 1.7: Promote the multiplier effect.
The relatively low level of kit use by those within the students' circle should be addressed if the training is going to have a wider impact outside of schools.

II. Recommendations: Programme expansion

Recommendation 2.1: CPR training should be implemented on a mandatory and standardised basis in the second-level school curriculum.
To achieve a population-wide effect, CPR training must reach all students at some point in their second-level education, in which case it must be mandatory. A single standardised and validated training programme should be implemented in order to ensure quality and consistency of approach.

Recommendation 2.2: A coordinator or coordinating team at national level must be established to support and administer the programme.
CPR 4 Schools is unlikely to be self-sustaining, and while each school might take ownership of its own running of the programme, a coordinator at national level is needed. The role of the coordinator would cover all aspects of managing, developing, and promoting the programme.

Introduction

Sudden cardiac death

Cardiac arrest is a frequent cause of death, accounting for an estimated 5,000 deaths every year in Ireland (Task Force on Sudden Cardiac Death, 2006). Most sudden cardiac deaths (SCDs) are caused by an underlying heart condition, usually coronary heart disease (Chugh et al., 2004; Byrne et al., 2008). Nearly half of all deaths from coronary heart disease in the United States are SCDs (Meyerburg et al., 1993). The majority of SCDs occur outside of hospitals, and approximately three-quarters of these take place at home (Chugh et al., 2004; Müller et al., 2006; Byrne et al., 2008; Lloyd-Jones et al., 2009).

At present, a person's chance of survival from an out-of-hospital cardiac arrest is low: for example, just 4% of cases survive to hospital discharge in one year in the West of Ireland (Byrne et al., 2008), while 3% of cardiac arrest patients presenting to the Mater Hospital, Dublin survive (Doyle et al., 2004). A Belfast-city-based study found a somewhat higher survival rate of 7%, but this figure is still very low (Moore et al., 2006). Medical professionals and cardiac health organisations believe, however, that mortality could be reduced – and even halved in the appropriate setting (Chamberlain and Hazinski, 2003) – by a more effective response from lay persons who witness a collapse (American Heart Association, 2005).

First responder role

The majority of cardiac arrests arise from ventricular fibrillation, a malfunction of the heart's electrical conduction system that causes a sudden onset of chaotic disturbance of the heart's electrical rhythm (Task Force on Sudden Cardiac Death, 2006). The normal rhythm can be restored by an electrical shock from a defibrillator, but it must be delivered within a few minutes of the arrest. The rhythm otherwise deteriorates, and the success of defibrillation decreases rapidly for every minute of delay (Larsen et al., 1993). The European Society of Cardiology task force on SCD has recommended a target time of 5 minutes between the call to emergency medical services (EMS) and defibrillation, but a longer delay is typical. Cardiopulmonary resuscitation (CPR) can play a critical role in this time interval. CPR performed by a witness to the cardiac arrest, such as a relative or member of the public, can prolong ventricular fibrillation, thereby serving as a bridge until the arrival of EMS personnel with a defibrillator or a trained person with a locally accessible defibrillator (available in many public places). A German study of cardiac arrests attended by EMS found that with bystander CPR, 23% of patients survived to discharge, compared with 4% when no bystander CPR was performed (Müller et al., 2006).

The American Heart Association (AHA) developed the concept of a chain of survival to articulate the elements of an effective community response that would improve the chances of survival from cardiac arrest. The chain comprises four essential links, each of which must be

performed quickly and effectively: calling the EMS for help, beginning CPR, defibrillation and advanced life support. The first two links are usually dependent on a bystander, a person likely to have little or no medical training.

Studies have documented that bystanders attempt resuscitation in just 14 to 45% of cardiac arrests that occur outside of hospital in the presence of an eyewitness (Wik et al., 1994; Müller et al., 2006; Lloyd-Jones et al., 2009). This relatively low level of bystander CPR is in part due to the lack of basic life support skills in the general population. Strengthening this second link in the chain of survival entails training the public on a large scale as first responders competent in CPR.

Disseminating CPR skills in the community

Government and health-care agencies in most countries have not set a priority, however, to promote CPR as a universal skill. The major endeavours to broaden the pool of available lay rescuers in the population have been undertaken by voluntary organisations. While training courses in CPR are widely available, participants are mainly young adults who have a duty to respond – occupational first aiders, for example (Potts and Lynch, 2006). A number of barriers to the take-up of training courses by the broader community have been identified, including cost, lack of time, and difficulty of access. Organisations in several countries have attempted to address the cost and inconvenience of traditional instructor-led courses by developing innovative approaches to training, such as peer training (Wik et al., 1994) and broadcasts of 30-second training slots on television (Potts and Lynch, 2006). An initiative in Seattle mass-mailed unsolicited instructional videos to over 8,000 homes, but researchers subsequently found that it did not increase the rate of bystander CPR in the area. In fact, the package was opened and the video watched in only about half the households (Eisenberg et al., 1995). The weak impact of this effort, which provided free and convenient training to a wide population, illustrates the additional barrier presented by low motivation among the general public.

Training initiatives must also instil confidence to respond in those who have been trained. Panic and fear of not performing correctly may deter bystanders trained in CPR from using those skills when confronted with a cardiac emergency (Swor et al., 2000), while lack of confidence may cause them to assume that someone else is more competent and should respond instead (Potts and Lynch, 2006). The need for regular retraining after the initial training must also be addressed, as retention of skills has been found to decline substantially in as little as six months (Isbye et al., 2007a).

CPR in schools internationally

The school system, both primary and post-primary, offers a promising route to the widespread dissemination of CPR skills. Schools provide a suitable environment for training and reinforcement of knowledge and skills. School children are more accessible and more easily motivated than adults; they learn quickly and retain skills well. An International Liaison Committee on Resuscitation (ILCOR) symposium on education in resuscitation in 2001, where participants included the European Resuscitation Council and the AHA, strongly recommended the inclusion of CPR in the school curriculum as a valuable long-term investment. The Irish

government's Task Force on Sudden Cardiac Death Report in 2006 has echoed that recommendation. By incorporating resuscitation skills into the curriculum, it is hoped that greater awareness and acceptance of CPR as well as specific resuscitation skills might be instilled routinely in an upcoming generation.

CPR training for school students was first introduced in Norway in the 1960s (Lind and Stovner, 1963) and has been pursued in many other countries since then, including Canada (Liberman et al., 2000), the United Kingdom (Lester et al., 1996; Jones et al., 2007), New Zealand (Lafferty et al., 2003), Denmark, Poland and several states of the United States (Reder and Quan, 2003; Kelley et al., 2006).

An example of one such endeavour is the ABC for Life programme in Northern Ireland, which was established in 2004 with the aim of teaching basic life support to 25,000 Year 7 students (aged 10 to 12 years) each year in primary schools. The programme uses a pyramidal training model: medical students who were trained as instructors tutored small groups of teachers in basic life support skills, and these teachers now train students in their schools. Research on the programme has found significant increases in CPR knowledge and skills among school children who had been trained (Connolly et al., 2007; Toner et al., 2007).

A number of studies have shown that children are capable of learning CPR (e.g., Lester et al., 1996; Uray et al., 2003; Lubrano et al., 2005) and most children score well on knowledge assessments of basic life support skills following training (Lester et al., 1996; Reder et al., 2006), even those as young as 10 years old (Toner et al., 2007). Results are more mixed when the quality of CPR performed is evaluated: inadequate ventilations and low rates and depths of compression have been documented (Reder et al., 2006; Younas et al., 2006). However, age does not appear to have been the main limiting factor. Performance and retention of resuscitation skills by adult lay persons and medical personnel have also been shown to be wanting (Kaye and Mancini, 1998; Lynch et al., 2005; Wik et al., 2005). Disappointing results from assessments of CPR performance have led to a focus on simplifying the procedure for first responders as well as improving training to concentrate just on the elements essential for survival from cardiac arrest – giving rescue breaths and chest compressions.

In recent years both Denmark and Norway have embarked on the mass-training of school-age children using self-instruction kits (Isbye et al., 2007; Lorem et al., 2008). The *CPR Anytime* kit, developed by Laerdal Medical for the AHA, comprises an instructional DVD, an inflatable mini-manikin and a handbook. In both countries, a free kit was offered to schools for all seventh-graders (12–14-year-olds). Training sessions were held in classrooms and facilitated by the class teacher.

This approach to training has been found to be at least as effective as traditional instructor-led courses but considerably more efficient (Lynch et al., 2005; Isbye et al., 2006). The kit addresses many of the barriers that have restricted the more widespread acquisition of CPR skills among the general public. By removing the need for an instructor it reduces costs, and no problems of access arise because the kit may be used in any location, in school or at home. The DVD runs for 22 minutes and training can be completed in an hour-long session. The instruction focuses on a straightforward 'pump-and-blow' technique, which simplifies and streamlines instruction, and because each kit contains a manikin, an individual may practise

and refresh their skills regularly. The kit also enables the training to reach others in the circle of the initial user. An important goal of the Danish and Norwegian projects was to disseminate the training beyond the children to a second tier within their communities, so children were encouraged to use the kit at home to train their families and friends. In Norway, 2.9 other people were trained per student trained, and it was calculated that 4% of the population was trained. The figure in Denmark was 2.5 other people for each student trained. In this way, training reached an older age group, the children's parents. It is worth noting, however, that while the Norwegian school children attained acceptable scores on a skills test following training, the second-tier adults scored significantly more poorly, and the researchers suggest that the children may have been too young to motivate the adults.

CPR in Irish schools

Training Irish school-going children in CPR is one element of the Irish Heart Foundation's strategy to improve SCA survival rates in Ireland. Other strands include the IHF's standard training programmes for the general public in basic life support (BLS) and advanced cardiac life support (ACLS), and the Heartsafe AED programme (which supports communities to strengthen their local chain of survival). The IHF believes that training children early in life can impart CPR skills to them before they develop fears and self-consciousness around the procedure. By training all children during their school years, it is possible to establish CPR as a generic population-wide skill, which in turn will provide a basis for increasing rates of bystander CPR.

Since the inception of Transition Year in post-primary schools in the mid-1990s, several schools have included CPR training in their Transition Year curriculum, usually as part of a first aid module. However, the approach to training the skill has been unstandardised as each school has made its training arrangements independently. For many schools, the use of instructor-led training has not been an option due the cost – an average of €80 per student.

In 2007 the IHF developed a proposal for submission to the Department of Education and Science to incorporate a standardised CPR programme into the Transition Year curriculum. The programme was developed in association with Connolly Hospital and involved training teachers as CPR instructors who would in turn train students in their schools. A one-day instructor course was piloted with six teachers in Mount Sackville School in Dublin. It became clear, however, that funding and administration of the programme nationally would be a substantial undertaking. The Department of Education and Science, in its response to the proposal, expressed several concerns about these issues, and the IHF concluded that an approach less demanding of resources was needed.

In 2008 the IHF developed an alternative training model, similar to that successfully implemented in Norway and Denmark, using the *CPR Anytime* kits to train students. The use of kits could radically simplify the implementation of a training programme in schools, reducing the cost and removing the administration overhead of training teachers as instructors. The Transition Year National Coordinator at the Second Level Support Service (SLSS) supported the initiative, and CPR 4 Schools, an ambitious pilot programme to roll out CPR training to 27,000 Transition Year students, was instituted in the 2008–09 school year. The IHF covered the cost

of the kits through fundraising in its Happy Heart Weekend appeal and encouraged the schools to take part in the fundraising endeavour. If the pilot programme was received well by teachers and students, it would provide a foundation for building CPR training permanently into the second-level school curriculum. The IHF envisaged that schools and teachers would take ownership of the programme at that point, and the kit would become a standard inclusion in a student's booklist.

The current study

This report outlines an independent evaluation of the CPR 4 Schools programme by the Population Health Sciences Division of the Royal College of Surgeons in Ireland (RCSI). The study aimed to examine teachers' experiences of running the programme in their classrooms and to identify what they considered to be the positive and the negative aspects of the training. The study also aimed to assess students' knowledge and acceptance of CPR just after completing the programme and again six months later, to evaluate the medium-term impact of training.

Programme Methods

Programme set-up

The CPR 4 Schools training programme is aimed at Transition Year students in post-primary schools, who range in age from 15 to 17 years. There are 732 post-primary schools in the Republic of Ireland, 555 of which offer Transition Year to students who have completed their Junior Certificate. In the 2008–09 school year, 28,350 students were enrolled in Transition Year.

The IHF began to promote the CPR 4 Schools programme to schools at the start of the 2008–09 school year. The initiative was launched in early September at a course for new Transition Year coordinators. IHF representatives subsequently attended six regional workshops for existing Transition Year coordinators as well as the national Transition Year conference in October, where they explained the programme and demonstrated the use of the kit. The IHF had originally planned to roll out the programme to schools in September 2009, but feedback from the teacher body recommended that the students who fundraised for the kits over Happy Heart Weekend (in May 2009) should be the ones to receive them, so the plans for roll-out were brought forward to April–May 2009. Schools were urged to register for the programme, which would provide the IHF with contact information for fundraising purposes. Registration took place from October 2008 to May 2009.

Training course details

CPR 4 Schools is delivered using the *Family & Friends CPR Anytime* kit. The kit is a complete self-instruction learning programme that comprises an instructional DVD, an inflatable mini-manikin with a face and chest, and a reference booklet. The instruction describes a straightforward 'pump-and-blow' technique that can be taught easily. The skills covered are limited to recognition of an emergency, calling the emergency response number, and performing the cycle of lung ventilation and chest compression adequately until help arrives. The DVD was produced for an American audience but was amended before distribution to Irish students to change references to the US emergency telephone number 911 to the Irish equivalent 999. The number change was approved by the AHA and implemented by Laerdal.

The training is self-directed: instruction on how to perform CPR is provided by the DVD, and students practise the technique on the manikin. Teachers do not need to have any knowledge of CPR and act as facilitators to the training rather than instructors. They are asked to provide a room for students to practise on the manikins, as well as a large television or a projector and a DVD player for showing the DVD. The basic CPR instruction runs for 22 minutes. Once they have completed the training, students keep the kits and are encouraged to teach family members and friends the technique.

Roll-out

While it was expected that teachers would take ownership of the training, the IHF provided support by preparing a lesson plan for the training session (see *Appendix A*) and creating an information section for teachers on its website. In February 2009, a sample kit was sent out to all schools together with a newsletter that included the lesson plan of the course. In this kit, the reference to 911 had not been changed to 999, but teachers were informed of this and were advised to use a DVD from the student kits for the classroom training session.

Cardiac Services, a supplier of medical equipment, provided free distribution of 27,285 kits to 535 schools between 27 April and 29 May. A free kit was supplied for each Transition Year student, but they were asked to fundraise €25 per kit in their community over Happy Heart Weekend to help cover the cost of the kits. The supply of kits ran out before all schools received an allocation; hence 20 schools, none of which had registered for the programme, did not receive kits. Once the kits had been distributed, the schools independently implemented the programme without further involvement from the IHF.

Survey Methods

Subjects and sampling

This evaluation study of the CPR 4 Schools training programme is based on three surveys – one to assess teacher response, a second to assess student response just after training, and a third to assess student response six months after training. The study samples were drawn from the 367 schools that had registered for the CPR 4 Schools programme by 30 March, 2009. All the teachers who had been registered as contacts in these schools [1] were invited to participate in the teacher survey.

For the student surveys, a sample of 1,500 was derived using a standard sample size calculation formula, based on an overall Transition Year student population of *c.* 27,500, with a confidence level of 95% and a confidence value of 2.5. In order to ensure that at least 1,000 eligible students completed questionnaires, 40 schools were randomly selected to take part in the evaluation. The total number of Transition Year students in these schools was estimated to be 2,124, based on information given to the IHF by the schools.

Ethical approval

The study protocol was approved by the RCSI Research Ethics Committee.

Teacher survey

To assess teachers' response to the training, a questionnaire was developed (see *Appendix B*) that included questions on the following: whether the training had been successful; what aspects teachers endorsed; what aspects they were critical of; whether they would run the training the following year; and whether they had had any difficulties. Details were sought on other CPR-related activities in the school in the previous five years – whether any had taken place, the provider of the training, the classes trained, and the estimated number of students trained. Descriptive information on each school was also gathered.

The questionnaires were posted to 327 teachers[2] on 16 and 17 April. A covering letter introducing the study, an information sheet with a fuller description, and a stamped addressed envelope for return of the questionnaire were also included. Those who had not returned the questionnaire were sent a reminder by e-mail or post on 13 May.

Initial s tudent survey

The questionnaire developed for the first student survey aimed to assess knowledge and acceptability of CPR among students following training (see *Appendix B*). Eight multiple-choice

[1] These were mostly Transition Year coordinators but also included PE teachers and principals.
[2] All those who had registered for the programme by 30 March excluding those whose students were selected for participation in the student survey.

questions tested their knowledge of the principal steps in CPR. Likert-type questions, using ordered response levels, asked students to indicate the likelihood they would perform CPR if they witnessed a cardiac arrest, the effect of the training on their confidence to perform CPR, and whether they would use the kit to train family and friends. To assess awareness of first-responder readiness in their communities, they were asked whether they knew of the presence of heart-related emergency equipment in a place familiar to them and the distance of that equipment from their home. Students were also asked to suggest improvements to the training. The questionnaire gathered basic demographic information on students' age and sex, and the gender mix in their schools, as well as details on any CPR training they had previously undertaken. Questionnaires were completed anonymously.

Only students aged 16 years or older (expected to be most Transition Year students) were asked to fill out the questionnaires since they could themselves consent to participate in the study – parental consent would have been required for younger students. Students were encouraged to participate in the study by the offer of entry into a draw for a Nintendo Wii Fit video game console if they completed the questionnaire.

The contact teachers in schools selected for the student survey were contacted by e-mail or post (when e-mail wasn't available) on 17 April to inform them of the study, to request their cooperation with the student survey, and to describe what their participation required. No-one declined to take part in the study following this contact.

A second version of the teacher questionnaire was prepared for teachers in these 40 schools. This version was the same as the original sent to teachers in other schools but with three additional questions related to the student survey – the number of students eligible to take part in the survey (i.e., those 16 years or over who had completed the training), the number trained, and the number who completed the survey.

The survey documentation was posted out to schools on 16 and 17 April. As well as questionnaires, each pack included a covering letter, an information sheet for the teacher, an information sheet and consent form for each student, and a stamped addressed envelope to return the questionnaires.

On 14 May, a reminder was sent to teachers who had not returned survey packs; they were asked to update the research team if the training had been cancelled or deferred. A similar request was made on 25 May.

Follow-up student survey

A follow-up survey of students in schools that had responded to the initial survey was conducted in the first term of the 2009–10 school year to examine how well students had retained knowledge of CPR after six months and whether their attitudes to CPR had changed. The eight multiple-choice knowledge questions in the original questionnaire were put to students again, as were the questions on willingness to perform CPR in an emergency, confidence to perform CPR, and motivation to share the kit with others (see *Appendix B*). To see whether recognition of the first-responder role in communities had changed, students were again asked whether they were aware of the location of defibrillation equipment and its

distance from home. New questions were added to the questionnaire to determine whether students shared the kit at home and with whom, whether they had used their CPR skills, and whether the programme had led them to take further training. A question was also included to examine whether students had discussed the training with family or friends. Students were again asked to suggest improvements to the training, and to provide basic demographical information on their age and sex, and the gender mix in their schools.

The survey documentation was posted to the contact teachers on 24 September, 2009. The pack included a questionnaire, information sheet and consent form for each student, as well as a covering letter and a stamped addressed envelope for the return of questionnaires.

Teachers who had not returned questionnaires by November were contacted by telephone in the first week of November. Two subsequent reminders were given as necessary.

Statistical analyses

Analyses were conducted for all valid surveys (from students aged 16 and over). Basic descriptive statistics (frequencies and percentages) were calculated for categorical variables, while mean and median were determined for numerical variables. Bivariate analysis was performed and reported where significant. A two-sided *p* value of 0.05 or less was regarded as statistically significant. Statistical analyses were performed with SPSS statistical package version 15.0 for Windows.

Results

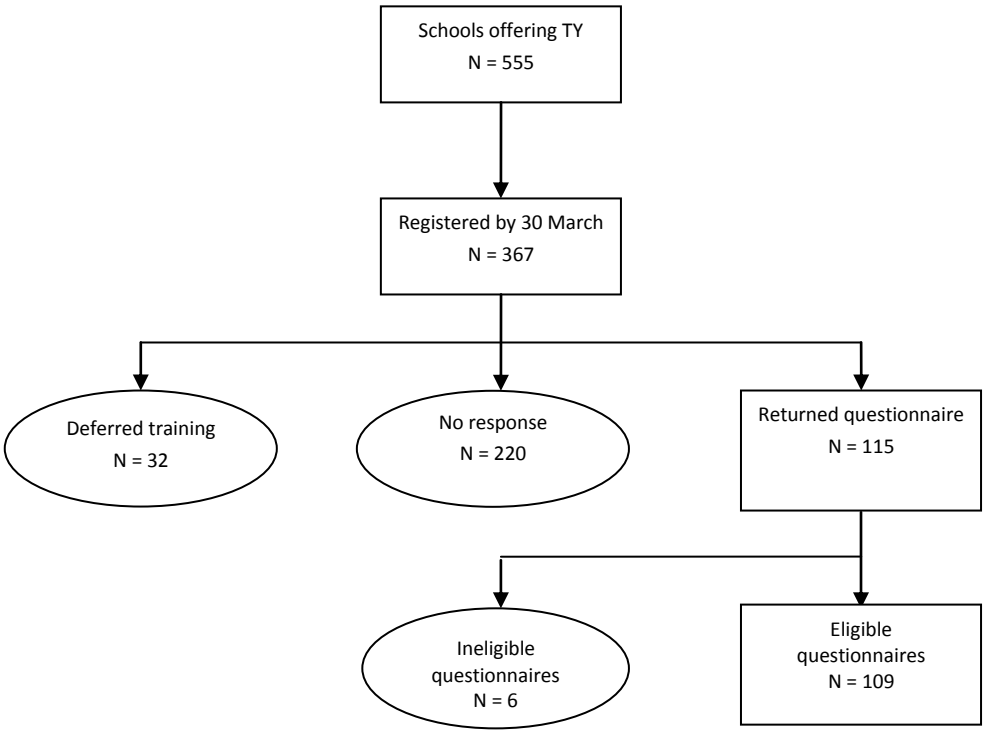
The results of the three surveys are presented separately in this section. The teacher survey findings are outlined first, starting with background information on the survey response and a description of the schools. Details on schools' previous CPR activities and on the CPR 4 Schools training session are presented. This is followed by findings on teachers' experiences of the training – aspects they supported, problems encountered, and recommendations for improvement. Findings from the first student survey begin with a description of the survey response and characteristics of the sample. Results of the measures assessing knowledge, acceptance, and awareness of CPR are examined. Students' recommendations for improving the programme are then outlined. Findings from the follow-up student survey are presented last, in a similar format as the initial survey findings.

I Teacher survey

1 Teacher survey response

Figure 1 illustrates teacher response to the survey. Of the 367 teachers included in the mail-out, 115 returned questionnaires. When contacted, 32 of the remaining respondents stated that they would not be running the training before the end of the school year; 220 did not

Figure1: Response to the teacher survey



respond to either the original mail-out or to reminders. Of the 115 questionnaires returned, 6 were found to be ineligible for inclusion as the respondents had not run the CPR 4 Schools programme. This left a total of 109 questionnaires for analysis.

To calculate the response rate, we estimated the number of the 367 schools that ran the training using figures from the student survey (see p. 29), where 33% confirmed they postponed training until next year. Based on an estimated 246 schools (67% of 367) running the training, the response rate was 44%.

2 Schools profile

Table 1 provides a profile of the schools that participated in the survey.

Table1: Characteristics of participating schools compared to schools nationally

	Sample		All schools
	N	**%**	**%**
Form of management (N=109)			
Secondary school	70	64%	53%
Vocational school/community college	28	26%	35%
Comprehensive/community school	11	10%	12%
Student body composition (N=109)			
Single sex, girls	40	37%	19%
Single sex, boys	14	13%	15%
Mixed sex	55	50%	66%
Size (N=104)			
Fewer than 100 students	4	4%	4%
100–399 students	44	42%	39%
400–699 students	36	35%	42%
700 students or more	20	19%	15%
Location (N=107)			
In open country	7	7%	Data not available
In a village	10	9%	
In a town (1,500+)	61	57%	
In a city (other than Dublin)	12	11%	
In Dublin city or county	17	16%	

Nearly two-thirds of participating schools (64%) were secondary schools, a further 26% were vocational schools or community colleges, and 10% were comprehensive or community schools. Half were mixed-sex schools, 37% were single-sex schools for girls, and 13% were single-sex schools for boys. These figures indicate that secondary schools and single-sex girls' schools were over-represented in the sample. The breakdown of post-primary schools nationally is 53% secondary schools, 35% vocational schools or community colleges, and 12%

comprehensive or community schools. Concerning the mix of boys and girls, 66% are mixed sex, 19% are girls-only, and 15% are boys-only.

Schools were mainly located in towns, with 57% of the sample classified in that category. The next largest group of schools, comprising 16%, was located in Dublin city and county, while 11% were based in cities other than Dublin, and 7% in villages. In terms of size, 42% had between 100 and 399 students enrolled, 35% between 400 and 699 students, and 19% 700 or more students. A small proportion (4%) had fewer than 100 students.

3 Previous CPR training in school

Eighty schools, 73% of the sample, had engaged in some form of CPR training in the previous 5 years, and the estimated total number of students taught CPR in that period was 10,611.

CPR training had been largely aimed at Transition Year students, with 88% of schools providing training to this group – see Table 2. Eight per cent had trained Fourth/Fifth Year students and 4% Second Year, Junior Certificate or Leaving Certificate students. Just one school had trained First Year students. Ten per cent of schools had trained just their teachers in CPR.

Table2: Provision of CPR training in past 5 years (N = 80)

	N	%
First Year	1	1%
Second Year	3	4%
Junior Certificate	3	4%
Transition Year	70	88%
Fourth/Fifth Year	6	8%
Leaving Certificate	3	4%
Teachers only	8	10%

Sixty-six respondents identified the providers of CPR training in their schools, which are listed in Table 3. The most common provider was the Irish Red Cross, which had been used by 24% of schools. The services of commercial first aid training organisations and qualified first aid instructors were also retained frequently, by 18% and 9% of schools respectively. In 17% of schools, teachers who had been trained in first aid conducted CPR training.

Table3: Sources of previous CPR training (N = 66)

	N	%
Irish Red Cross	16	24%
Commercial organisation	12	18%
Teacher with first aid training	11	17%
Qualified first aid instructor	6	9%
Order of Malta	6	9%
Civil Defence	5	8%
Fire brigade personnel	5	8%
Ambulance personnel	5	8%
Other **	6	9%

* Some schools used more than one provider

** Local hospitals, a local charity, Croí, and a local sports and leisure centre.

4 Training session details

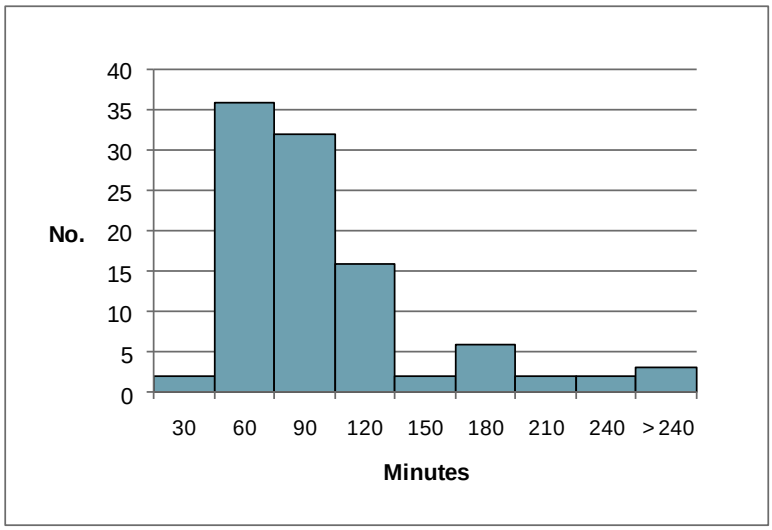
4.1 Number trained

The schools surveyed had 5,010 students enrolled in Transition Year, and 4,613 (92%) of these students took part in the CPR 4 Schools programme.

4.2 Duration

Figure 2 shows a distribution of the amount of time spent on the training session. Most schools took between 30 and 90 minutes for the session, and the median duration was 80 minutes.

Figure2: Histogram of CPR training session duration



The reported duration ranged between 25 minutes and 600 minutes. The larger time durations are likely to represent a first aid module in which the CPR training was bundled. In addition,

comments from respondents indicated that first aid modules were in many cases spread over a number of sessions, and the figure given was the cumulative total.

5 Experience of the programme

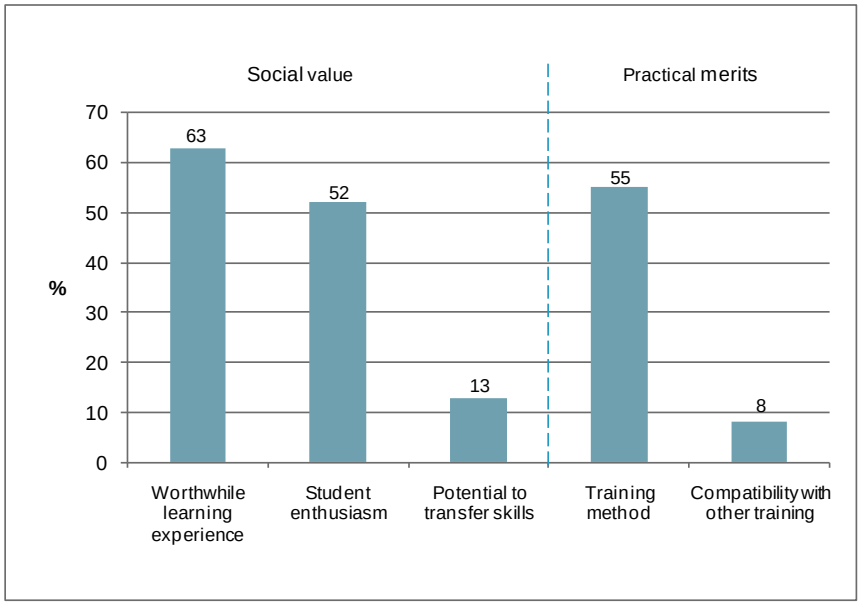
Teachers were asked a number of questions to elicit their views on the training. The first of these asked whether they felt the training had gone well. Almost all (97%) responded that it had, while the remaining 3% were unsure; no respondent reported that the training had been unsuccessful.

Asked whether they would run the course next year, 90% of the teachers were definite that they would, 8% responded that they possibly would, and 2% were unsure. None indicated that they would not run the course the following year.

5.1 Reasons for endorsement

In open questions, teachers were invited to give reasons for their endorsement of the course. These responses were categorised thematically during the analysis and five main themes were identified. These themes in turn fell into two categories – those broadly relating to the course's social value and those relating to its practical merits (see Figure 3).

Figure3: Reasons for endorsing the course



Social value

Worthwhile learning experience. The main reason for teachers' support of the course – cited by 63% – was the worthwhile learning experience for students. Respondents commented especially on the importance or usefulness of the skill students had acquired:

! ű K ƨ NJ ƨ dz ∃ K ƭ è Ø l· ƭ dz l· ō ƭ Ŝ Σ NJ Ŝ ƭ Ŝ Ø l· y ́ ű Ŝ È Ŝ NJ Ŏ ƛ ă Ŝ Φ all should have.

> *Excellent opportunity for students to learn. These vital life skills should be compulsory for all students ...*
>
> *This is a wonderful skill for students to have. They are now more likely to stop and help somebody as they feel confident about CPR.*

Student enthusiasm. Just over half the teachers endorsed the course because of its success in engaging students' interest:

> *Students very keen on learning CPR. Gave it great attention and dedication.*
>
> *All the students really enjoyed it and participated very well.*
>
> *When all students are occupied çe.g. have use of Mini Anne çstudents' focus and interest remains high. Our students really enjoyed this course.*

Potential to transfer skills. The merit of transferring the skill to friends and family members was acknowledged by 13% of teachers:

> *A great pack that allows families to practise in the comfort of their own home.*
>
> *The idea of having the course on a DVD where students can go back to it again and again and practise at home and show to other members of their family has created a lot of interest and awareness.*
>
> *Also liked the ripple effect of the pack çbring it home and train those at home and in family çtraining circle gets bigger.*

Practical merits

Training method. The innovative approach to training was the second most common reason for teachers' positive response to the course, mentioned by 55%. Among other features, they praised the clarity and conciseness of the instruction, the concept of providing individual kits, and the inclusion of personal manikins to facilitate practice and skills refreshment:

> *I found the kit very user friendly. The DVD was easy to understand with clear instructions. ... I also have found it very student friendly.*
>
> *Kits are excellent. Students took great pride in taking them.*
>
> *This is a fantastic programme and to have a facility such as the CPR manikins is wonderful as it allows students an opportunity to practise CPR on an individual model.*

Compatibility with other training. A number of respondents remarked that the course complemented other first aid training the students had undertaken in the school or in their community:

> *The TY class have a first aid day as part of their course and by doing the CPR training in advance of this day, they're more prepared and have more questions to ask.*
>
> *Our classes (TY) had already done a practical first aid course so this was a great follow-through.*

Other merits of the course that teachers identified were the absence of cost to the school and students, the interest it generated among other classes, teacher enjoyment of the course, and the opportunity it gave for teachers themselves to refresh their skills.

5.2 Difficulties and criticisms

For the most part, criticisms of the course were few. Such difficulties that were encountered tended to be isolated, with one salient exception – the matter of timetabling the course.

Timetabling problems: The main difficulty – cited by 12% of teachers – was scheduling the course in the Transition Year timetable. Teachers noted that provision in the schedule for the training needed to be made much earlier in the school year; that the kits arrived late in the year; that the students were engaged in multiple other activities, some outside of school; and that Transition Year tends to finish up by mid-May:

> *It arrived late in the academic year for our school. First term is always a better time as it is more school-based.*
>
> *It would be better if the packs were sent out earlier in the year - end of school year is already so busy. The student packs didn't arrive until end of April/May.*

Concerns over teacher competency: Five teachers expressed some concern that they or other teachers would not have sufficient knowledge of CPR to facilitate the training and saw a necessity to have a person proficient in CPR present.

Student lack of engagement: In three schools teachers found that some students behaved immaturely and failed to take the training seriously. Another teacher noted that students were squeamish about giving breaths.

Criticisms of content: Three teachers objected to the instructor's US accent, and one remarked that the presentation was simplistic. One teacher mentioned that a student whose father had died suddenly had been upset by the subject matter.

Criticisms of the programme: One teacher queried the value of the training, questioning whether a once-off training session was sufficient; another remarked that it duplicated other first aid training already given earlier in the year; a third expressed frustration at having to repeat the session a number of times to compensate for student absences.

Technical problems: Two teachers mentioned trouble inflating a small number of manikins; another questioned the robustness of the manikin; a fourth found the volume of the DVD too low.

6 Suggestions for implementation and improvement

When asked whether they had any other comments on the programme, a number of respondents offered suggestions for implementing and improving the course. These have been classified and grouped below. It should be noted that these suggestions tended to be isolated and did not reflect a body of opinion amongst respondents.

Availability of the programme: It was suggested that the programme could be run with all classes or with Fifth and Sixth classes in primary school. It was also suggested that the programme be repeated in future years.

Equipment: Teachers suggested that the kits should contain more wipes, disposable lungs to enable the re-use of manikins by other classes, and individual masks for students.

Integration with Transition Year curriculum: One teacher proposed that the training might be linked in with a Biology class and a programme on healthy living. Another suggested that the programme should be repeated throughout the year to diminish the novelty of the manikins and focus students on the skills.

Content: Two cautions for inclusion in the content were proposed: one to tell students that giving CPR doesn't always save the life of the person; the other to warn students of the content of the DVD in case any were sensitive to the subject matter. It was also recommended that an image of the heart in relation to the sternum be provided so that students appreciate the importance of the location of pressure.

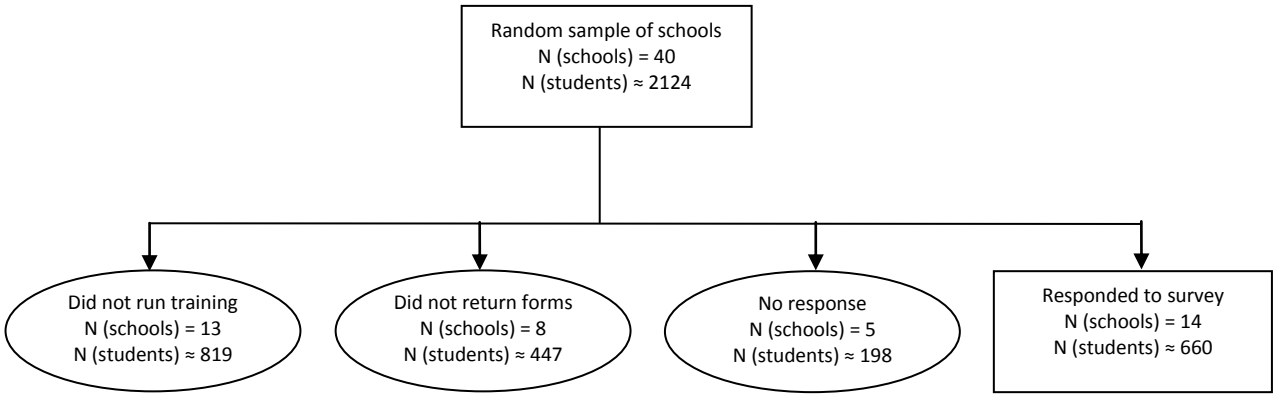
Certification: One teacher suggested that a certificate for completing the training be given to students.

II Initial student survey

1 Student survey response

Forty schools with an estimated 2,124 Transition Year students were approached to take part in the first student survey. Figure 4 illustrates the response from these schools. Fourteen returned questionnaires completed by students. Of the remaining schools, 13 did not run the programme (some did not have sufficient time and had deferred the training until the Autumn, others had not yet received kits when contacted); 8 ran the programme but did not return questionnaires; in the case of a further 5 schools that did not return questionnaires, we could not ascertain whether or not the training had taken place.

Figure 4: Student survey response – participation of schools

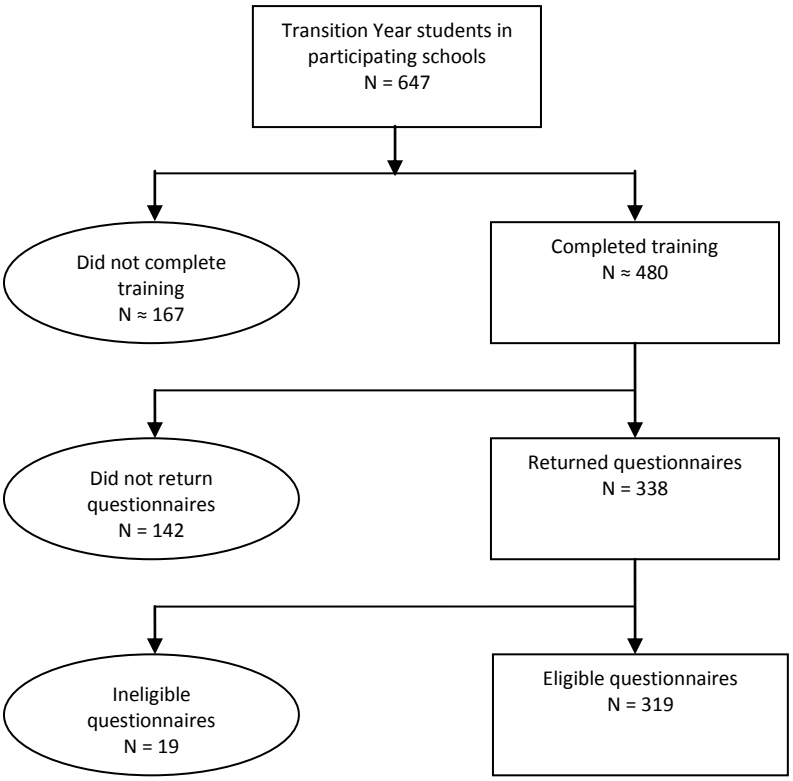


Excluding the 13 schools that did not run the training, the response rate of schools to the survey was 52%.

It had been estimated, based on information provided by schools to the IHF, that 660 students were enrolled in the 14 schools that returned questionnaires. Results from the survey reduced this figure to 647 students. Figure 5 outlines the participation of these students. Teachers were asked the number of students trained by the programme; not all provided this information, but we estimate the figure to be approximately 480 students. It is not known how many of these students were aged 15 and therefore ineligible to take part in the survey. A question to gather this data was included in the survey, but a number of teachers did not provide a figure or misinterpreted the question. In all, 338 student questionnaires were returned. Of these, 19 had been completed by students aged 15; these were excluded from the analysis, leaving 319 eligible questionnaires for analysis.

Excluding the 19 students who were under age from the total of 480 that completed the training, the response rate of students in participating schools was 69%.

Figure5: Student survey response participation of students



2 Sample description

Table 4 describes the students who responded to the survey. Ninety per cent of students were 16 years old and 72% were girls. Nearly half attended single-sex girls' schools, with another 45% attending mixed-sex schools. Just 6% attended single-sex boys' schools.

Table4: Characteristics of student participants (N = 319)

	N	%
Age		
16 years	288	90%
17 years	30	9%
18 years	1	< 1%
Sex		
Boys	88	28%
Girls	231	72%
Type of school attended		
Boys only	20	6%
Girls only	155	49%
Mixed	144	45%

3 Previous training in CPR

One hundred and twenty-one (38%) students had already received training in CPR, and 116 of these identified the providers of this training, which are shown in Table 5. For 49%, training had been provided by their school, being run either by a teacher in the school – often a PE teacher – or an external instructor.

*Table 5: Sources of CPR training (N = 116)**

	N	%
School	57	49%
Water-safety-related	26	22%
Irish Red Cross	13	11%
Irish Heart Foundation	6	5%
Order of Malta	5	4%
Scouts/Girl Guides	4	3%
St. John's Ambulance	2	2%
Other**	9	8%

**Some students were trained by more than one provider*

***Hospitals and local first aid training providers*

Twenty-two per cent had received CPR instruction in the context of water safety training, such as life-saving or swimming courses. These courses were provided mostly by Irish Water Safety. Other sources of training included the Irish Red Cross (11%), the Irish Heart Foundation (5%), the Order of Malta (4%), the Scout or Girl Guide organisations (3%), and St. John's Ambulance (2%).

4 Knowledge of CPR

Eight multiple-choice questions were put to students to assess their knowledge of CPR following training. Each question offered three answers, only one of which was correct.

4.1 Scores on individual questions

The percentage of students answering the questions correctly varied between 65 and 98% (see Table 6). In a very small number of cases students did not choose an answer.

Table 6: Responses to knowledge questions (N = 319)

	Correct		Incorrect		No response	
	N	%	N	%	N	%
Q1 What is the first thing you should do if you come across a collapsed person? *Answer*: Try to get the person to respond to you	213	67%	104	33%	2	0.6%
Q2 When calling an ambulance what telephone number would you use? *Answer*: 999	266	83%	52	16%	1	0.3%

	Correct		Incorrect		No response	
	N	%	N	%	N	%
Q3 Why would you shake and shout at a collapsed person? *Answer:* To check for response	311	98%	8	2%	0	0%
Q4 What action would you use to open the person's airway? *Answer*: Tilt the head back and lift the chin	300	94%	19	6%	0	0%
Q5 When assessing a person's breathing, what do you look at? *Answer*: Their chest	304	95%	15	5%	0	0%
Q6 When assessing a person's breathing, where and what do you listen for? *Answer*: Listen over the mouth/nose for breath sounds	292	92%	25	8%	2	0.6%
Q7 When giving breaths, for how long do you breathe into the person's mouth? *Answer*: 1 second	205	64%	113	35%	1	0.3%
Q8 How many presses and breaths would you give per cycle of CPR? *Answer*: 30 presses and 2 breaths	274	86%	44	14%	1	0.3%

Q1 and Q7, the questions on which students scored most poorly, were analysed further to discover the degree to which scores varied by school. In the case of Q1, variation was moderate, with 60 to 80% of students in most schools answering correctly; 1 school scored much lower. Examination of scores on Q7 indicated that while many schools had high scores, 2 scored particularly poorly, reducing the average score on that question.

4.2 Overall scores

The sample's average score out of 8 was 6.8 (85% of the total mark) and the median score was 7. Full marks were achieved by 37% of students, while another 31% correctly answered 7 questions. Approximately 7% correctly answered half or fewer of the questions (Table 7).

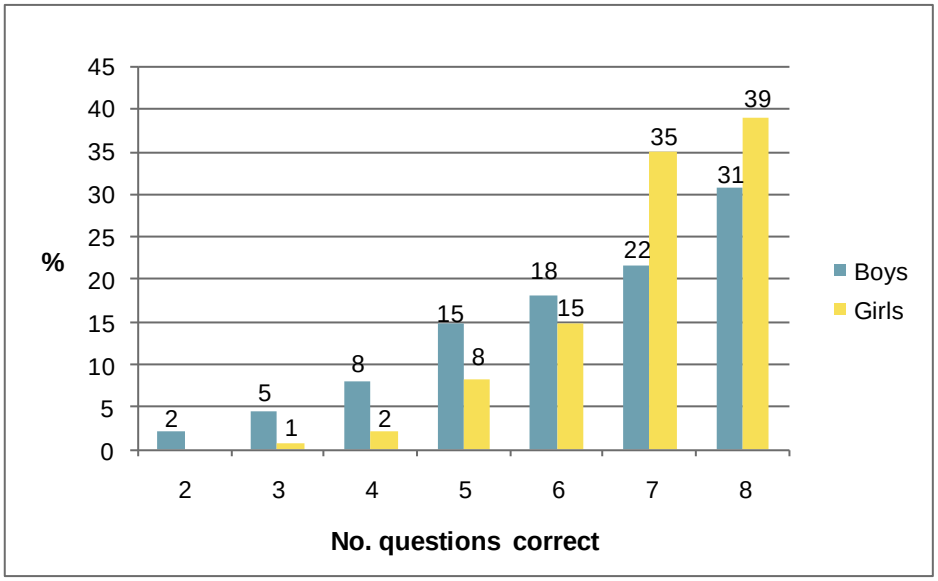
Table 7: Student scores (N = 319)

	N	%
8 questions correct	117	37%
7 questions correct	100	31%
6 questions correct	50	16%
5 questions correct	32	10%
4 questions correct	12	4%
3 questions correct	6	2%
2 questions correct	2	<1%

4.3 Boys and girls compared

Comparing the knowledge scores of boys and girls (see Figure 6), a greater proportion of girls than boys scored highly in the assessment: 39% of girls and 31% of boys received full marks, while 35% of girls and 22% of boys correctly answered 7 questions.

Figure6: Scores differentiated by sex (N = 88 (boys), 231 (girls))



The average score for girls was 7.01 (median = 7), while the average score for boys was 6.33 (median = 7).

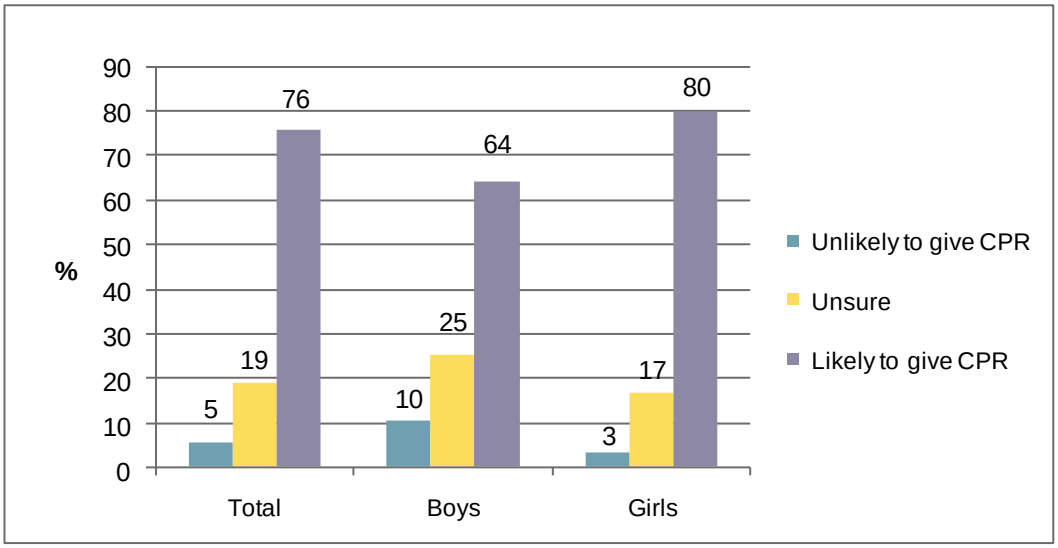
5 Impact of CPR training

5.1 Willingness to give CPR

Over three-quarters (76%) of the students reported that they would be likely to give CPR if they were present when a person collapsed, 19% were unsure, and 5% indicated that they would be unlikely to initiate CPR (Figure 7). Analysis of the relationship between score and willingness to give CPR indicated that a high score on the knowledge test was associated with increased likelihood of giving CPR (r = .370, p = .000).

Girls were more likely than boys to express a willingness to respond, with 80% indicating that they would give CPR compared with 64% of boys (Figure 7). A greater proportion of boys than girls expressed uncertainty about how they would respond if present at an emergency – 25% and 17% respectively.

Figure7: Likelihood of giving CPR (N = 316)



5.2 Effect of training on confidence in giving CPR

The students were asked about the effect of the training on their confidence to perform CPR in an emergency; Table 8 provides a breakdown of their responses. Ninety per cent responded that they were more confident, while 9% believed their confidence was unchanged, and 1% were less confident. The positive impact on confidence was stronger among girls, with 94% responding that they were more confident, compared with 78% of boys. Confidence was unchanged in 18% of boys and 5% of girls.

Table8: Confidence in ability to give CPR (N = 315)

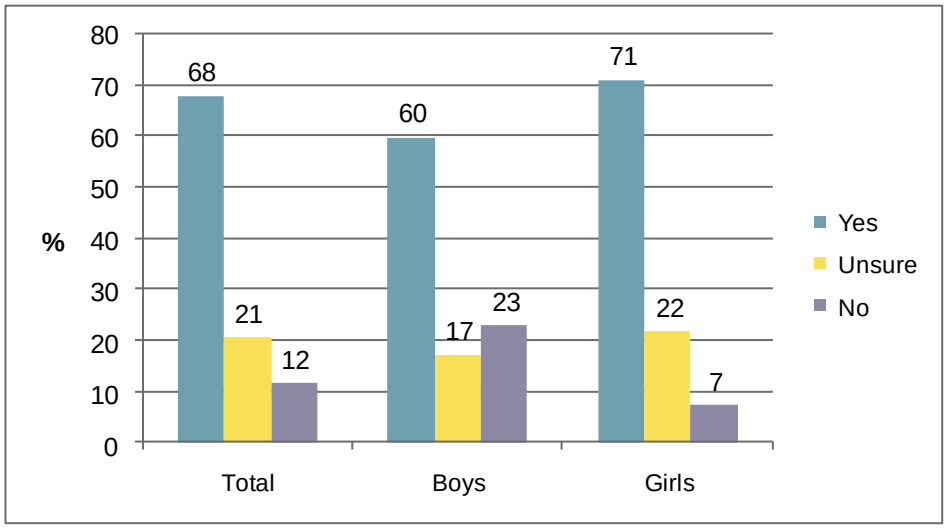
	Total		**Boys (N = 87)**		**Girls (N = 228)**	
	N	%	N	%	N	%
More confident	283	90%	68	78%	215	94%
Confidence unchanged	28	9%	16	18%	12	5%
Less confident	4	1%	3	3%	1	<1%

Further analysis indicated that higher CPR knowledge score was weakly associated with increased confidence in ability to perform CPR (r = -.172, p = .002).

5.3 Sharing the kit with others

Asked whether they thought they would show their family and friends how to do CPR, 68% of students responded that they would, 21% expressed uncertainty, and 12% responded that they would not – see Figure 8. Analysing the results by gender shows that a greater proportion of girls than boys indicated that they would share (71 vs 60%) or were unsure that they would share (22 vs 17%) their new knowledge. Twenty-three per cent of boys compared with 7% of girls did not intend to show the kit to others.

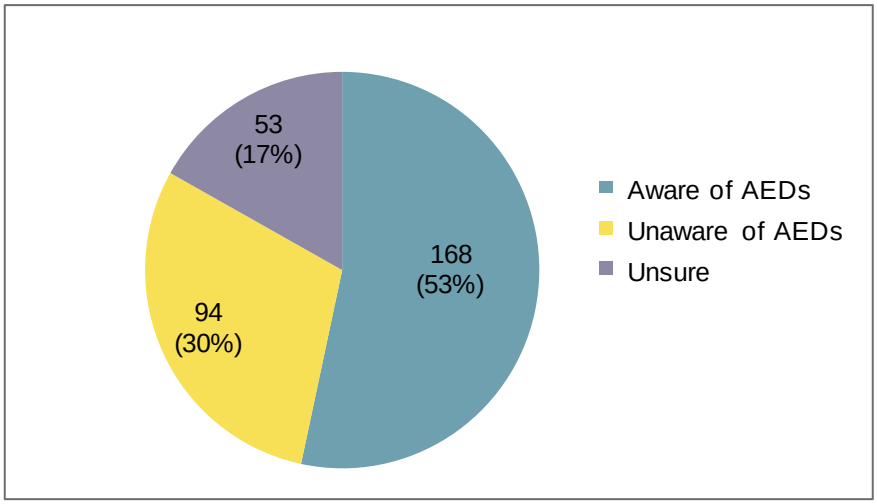
Figure 8: Intention to show the kit to family and friends (N = 316)



6 *Awareness of defibrillation equipment*

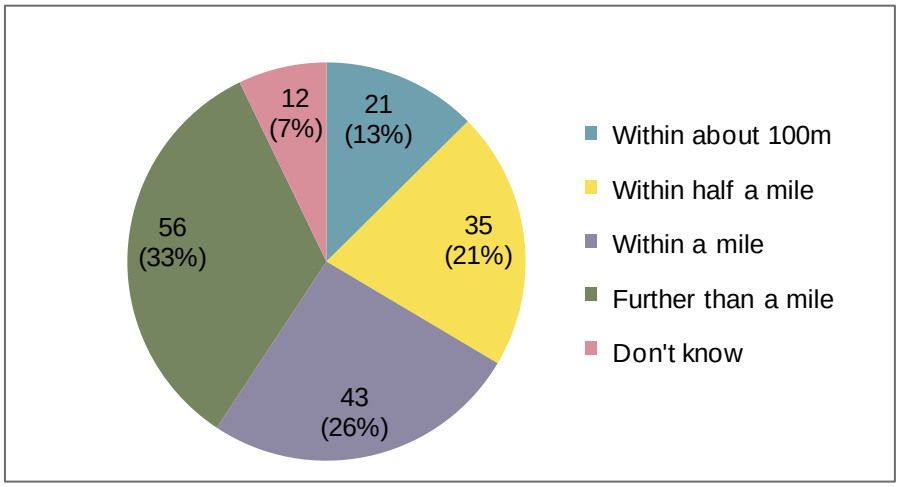
To assess their awareness of first-responder readiness in the community, students were asked whether they knew of a familiar place that had installed heart-related life-saving equipment such as a defibrillator. As Figure 9 shows, just over half the students (53%) were aware of the site of a defibrillator, while 30% did not know of any such equipment, and a further 17% were unsure.

Figure9: Awareness of AED in their community (N = 315)



Students who answered Yes to the question were then asked to estimate how far that equipment was from their home. For 60% of students the equipment was a mile at most from home.

Figure10: Estimated distance of AED from home (N =716)



7 Suggestions on improving the programme

In response to an open question inviting students to suggest improvements to the programme, 51 students (16%) offered ideas. These have been categorised and are presented in Table 9. The most common suggestion was for the provision of more CPR training opportunities in schools, which was proposed by 6 students. Students also proposed that CPR training be made compulsory in schools, some suggesting workplaces too, and that it be more widely available. A number suggested that an Irish version of the DVD would be more suitable for the target audience.

In addition, 39 students (12%) made positive comments about the programme instead of offering suggestions, for example: 'I think this programme is excellent and there is no need for any changes or suggestions'; 'I think it is perfect and you should be very proud of your work. Thank you for showing me CPR. Well done!'; and 'I found no fault. It was a good programme and I think it is a very important skill to know.'

Table9: Suggestions for programme improvement(N = 51)

	N
CPR programme	
Provide more CPR training activities in schools	6
Train a younger age group in order to improve awareness	4
Allow students to keep manikins	2
Provide individual kits	2
Test CPR performance	1
Provide instructors	1
Course content	
Localise the DVD with an Irish accent	5
Allow for more practice	4
Include extra steps or other first aid	4
Improve the explanation of points	2
Provide a more sophisticated DVD	2
Amend the cycle to 15 compressions and 2 breaths	1
CPR in the community	
Make CPR training compulsory in schools and/or workplaces	5
Make the training more widely available	5
Improve public awareness of CPR	2
Make more defibrillators available in the community	1
Equipment	
Include more wipes	3
Provide a larger manikin	1

The suggestion that students be allowed to keep the manikins implies that some students were not aware that this was the intention of the programme, while the reference to the provision of individual kits suggests that some students were trained using just the teacher's kit.

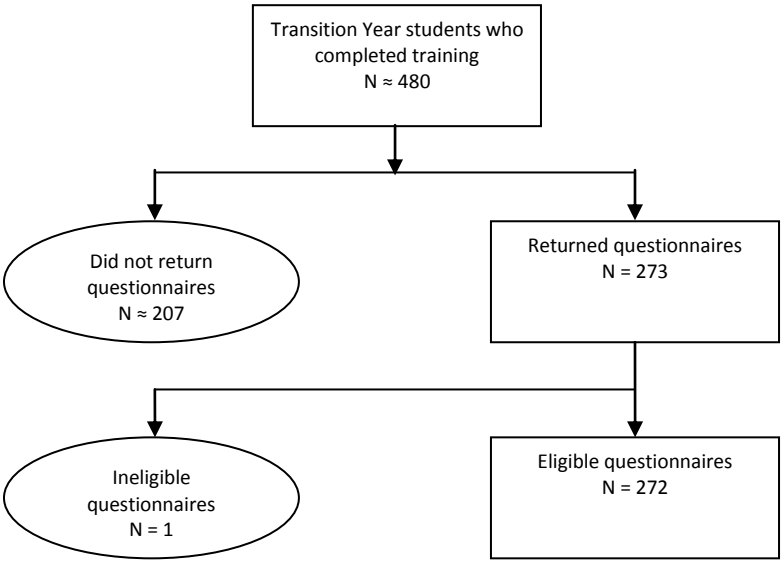
III Follow-up student survey

1 Follow-up survey response

The 14 schools that responded to the initial survey were contacted for the follow-up survey. Of these, 11 schools had returned 273 questionnaires by the deadline. From the initial survey, we had estimated that approximately 480 students in the 14 schools had taken part in the CPR 4 Schools training. Based on that figure, the response rate to the follow-up survey was 57%.

Seventy-six respondents to the follow-up survey (28%) had not taken part in the original survey. A preliminary analysis of the data indicated that including this group did not substantially affect the results (see *Appendix C*). The results presented here therefore include this group. One respondent was 15 years old and was not eligible for inclusion in the analysis (because parental consent was not available).

Figure11: Follow-up surveyresponseçparticipation of students



2 Sample description

Characteristics of the follow-up respondents are outlined in Table 10. This group was somewhat more gender-balanced than original survey group – 65% were girls compared with 72% in the initial survey. The majority (72%) attended mixed-sex schools (compared with 45% in the initial survey), while the remainder attended single-sex girls' schools. None attended a single-sex boys' school. The proportion of 16-year-olds fell from 90% to 64%; this would be expected as students would have turned 17 over the period since the first survey.

Table10: Characteristics of follow-up participants (N = 272) compared with initial survey participants

	Follow-up survey N	Follow-up survey %	Initial survey %
Age			
16 years	174	64%	90%
17 years	96	35%	9%
18 years	2	1%	< 1%
Sex			
Boys	95	35%	28%
Girls	177	65%	72%
Type of school attended			
Boys only	0	0%	6%
Girls only	75	28%	49%
Mixed	197	72%	45%

3 Knowledge of CPR

3.1 Scores on individual questions

Students were re-tested to assess how well they retained knowledge of CPR after six months. Table 11 compares the proportion of correct answers at follow-up and directly after training. A decline in correct answers at follow-up was apparent for most questions. The greatest decline was for Q1 (22%) and Q7 (52%), the questions with the lowest percentage of correct answers in the initial survey, as well as Q8 (24%).

Table11: Correct responses to knowledge questions in follow-up (N = 272) compared with initial survey

	Follow-up survey N	Follow-up survey %	Initial survey %	% change
Q1 What is the first thing you should do if you come across a collapsed person? *Answer*: Try to get the person to respond to you	141	52%	67%	- 22%
Q2 When calling an ambulance what telephone number would you use? *Answer*: 999	228	84%	83%	+ 1%
Q3 Why would you shake and shout at a collapsed person? *Answer:* To check for response	264	97%	98%	- 1%
Q4 What action would you use to open the person's airway? *Answer*: Tilt the head back and lift the chin	239	88%	94%	- 6%
Q5 When assessing a person's breathing, what do you look at? *Answer*: Their chest	262	96%	95%	+ 1%
Q6 When assessing a person's breathing, where and what do you listen for? *Answer*: Listen over the mouth/nose for breath sounds	241	89%	92%	- 3%

	Follow-up survey N	Follow-up survey %	Initial survey %	% change
Q7 When giving breaths, for how long do you breathe into the person's mouth? *Answer*: 1 second	84	31%	65%	- 52%
Q8 How many presses and breaths would you give per cycle of CPR? *Answer*: 30 presses and 2 breaths	178	65%	86%	- 24%

3.2 Overall scores

The average score out of 8 was 6 (75% of the total mark) and the median score was 6. A sizeable decline in the percentage of students achieving full marks is evident (see Table 12) – 11% in the follow-up, compared with 37% immediately after training. One-quarter correctly answered 7 questions, compared with 31% in the initial survey. Ten per cent correctly answered half or fewer of the questions, an increase from 7%.

Table12: Student scores in follow-up (N =272) compared with initial survey

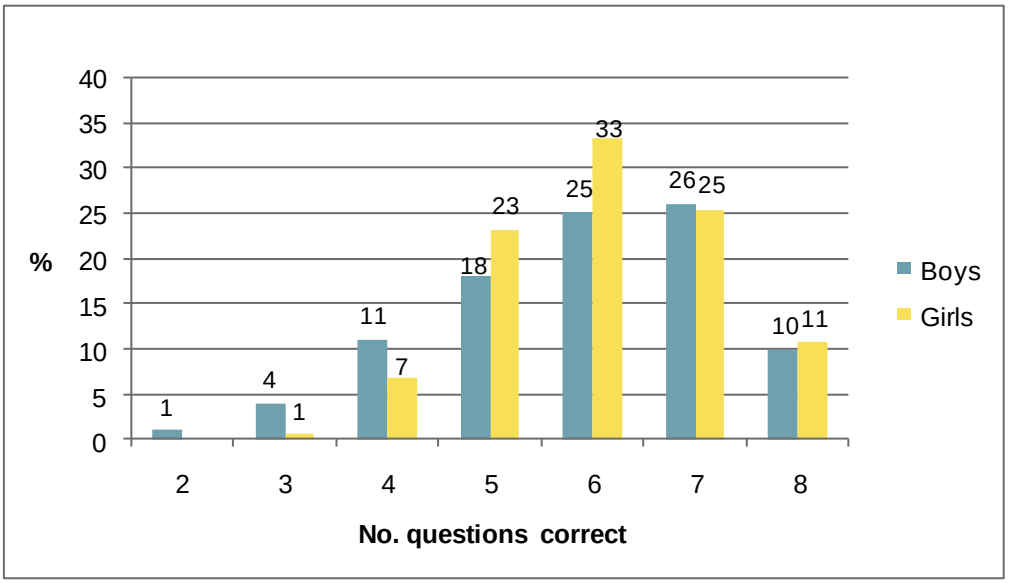
	Follow-up survey N	Follow-up survey %	Initial survey %
8 questions correct	26	11%	37%
7 questions correct	60	26%	31%
6 questions correct	75	31%	16%
5 questions correct	49	22%	10%
4 questions correct	19	8%	4%
3 questions correct	5	2%	2%
2 questions correct	1	<1%	<1%

Comparisons between student scores in the initial and follow-up surveys should be treated with some caution, however, as student responses were not linked – not all students who responded to the first survey completed the follow-up questionnaire and vice-versa. Therefore we cannot comment on the increase or decrease in knowledge of individual students.

3.3 Boys and girls compared

The gap between high-scoring boys and girls was more or less eliminated in the follow-up (Figure 12): 11% of girls and 10% of boys received full marks (compared with 39 and 31% respectively immediately after training), while 25% of girls and 26% of boys answered 7 correctly (35 and 22% respectively in the initial survey). More girls than boys answered 5 or 6 questions correctly (girls: 23 and 33%; boys: 18 and 25%), reversing the pattern seen in the initial survey (girls: 8 and 15%; boys: 15 and 18%).

Figure12: Scores differentiated by sex (follow-up) (N = 95 (boys), 177 (girls))



The fall in scores was greater for girls than for boys. The average score for girls declined by 13% to 6.08 (median = 6) from 7.01 (median = 7) in the initial survey. Boys' average score declined by 7% to 5.89 (median = 6) from 6.33 (median = 7).

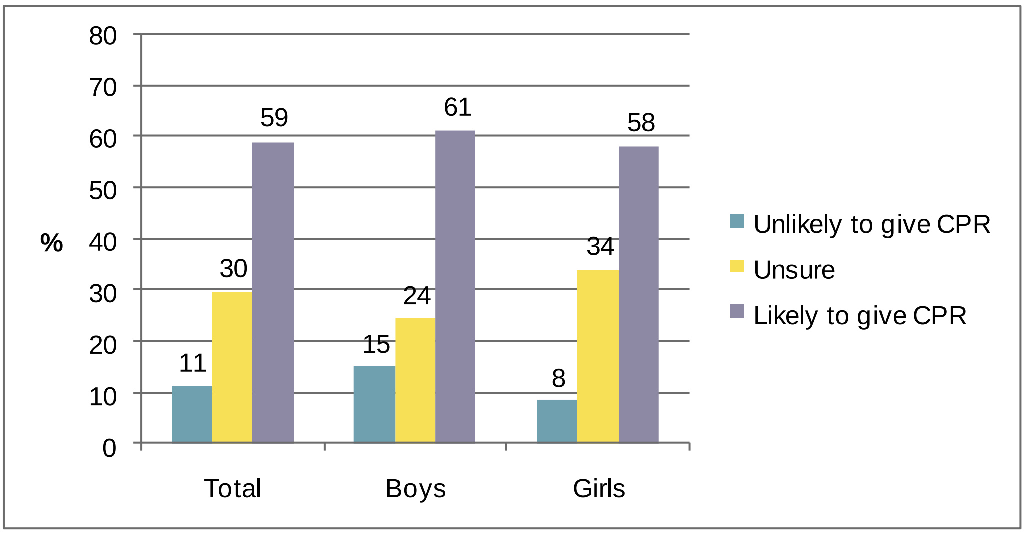
4 *Impact of CPR training*

4.1 Willingness to give CPR

The proportion of students reporting that they would be likely to give CPR in an emergency fell from 76% to 59%, 30% were unsure (up from 19%) and 11% indicated that they would be unlikely to initiate CPR (up from 5%) (see Figure 13).

The responses from girls accounted mostly for this change in attitude. The percentage of girls expressing a willingness to give CPR declined from 80% to 58%, while the percentage unsure rose from 17% to 34%, and the percentage unlikely to give CPR rose from 3% to 8%. Boys' responses, on the other hand, changed little from the initial survey: 61% were likely to give CPR, 24% unsure and 15% unlikely to give CPR; this compares with 64%, 25% and 10% respectively in the initial survey.

Figure 13: Likelihood of giving CPR (follow-up) (N = 266)



4.2 Effect of training on confidence in giving CPR

Levels of confidence to perform CPR in an emergency also declined, but to less of an extent. In the follow-up, 84% responded that they were more confident having been trained, down from 90% in the initial survey. Confidence was unchanged for 14% (up from 9%) and 2% were less confident (up from 1%).

Table 13: Confidence in ability to give CPR, follow-up compared with initial survey

	Follow-up (N = 268) N	%	**Initial survey** %
More confident	224	84%	90%
Confidence unchanged	38	14%	9%
Less confident	6	2%	1%

As Table 14 shows, the fall in confidence was of a similar degree amongst girls and boys. Confidence continued to be stronger among girls, with 89% responding that they were more confident, compared with 74% of boys. Confidence was unchanged in 21% of boys and 10% of girls.

Table 14: [illegible] confidence in ability to give CPR, follow-up compared with initial survey

	Boys: follow-up (N = 94) N	%	**Girls: follow-up (N = 174)** N	%	**Boys: initial** %	**Girls: initial** %
More confident	70	74%	154	89%	78%	94%
Confidence unchanged	20	21%	18	10%	18%	5%
Less confident	4	4%	2	1%	3%	0%

5 Awareness of defibrillation equipment

Awareness of defibrillators in their communities increased amongst students in the period since training (see Table 15): 70% of students were aware of the site of a defibrillator, compared with 53% in the initial survey.

Table15: Awareness of defibrillators in the community, follow-up compared with initial survey

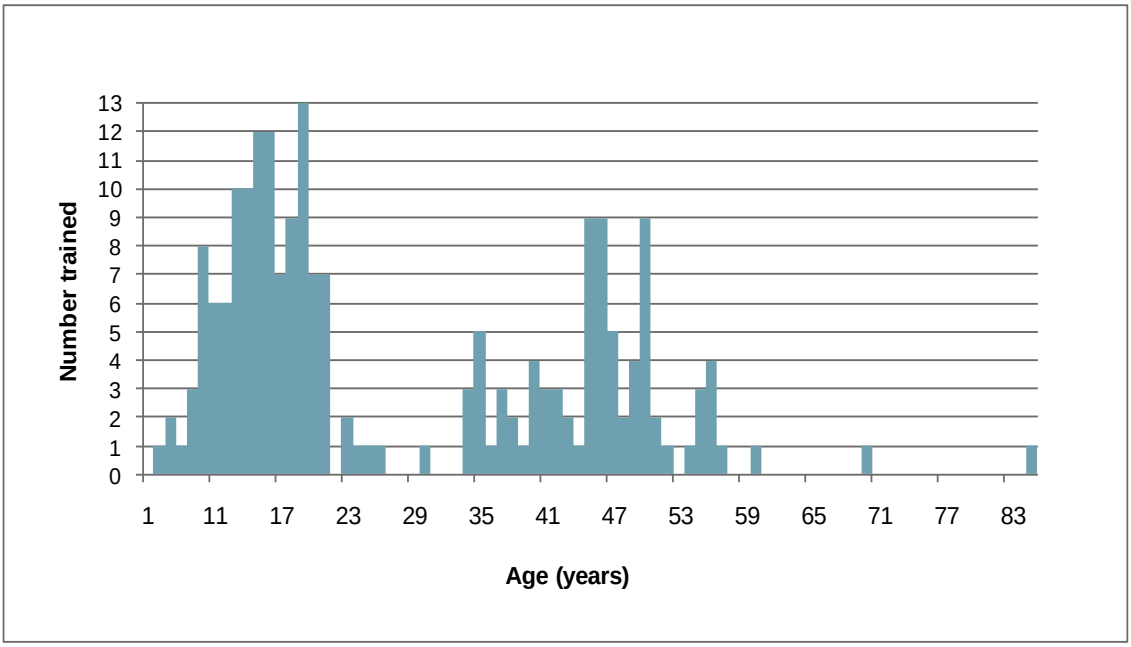
	Follow-up (N = 269) N	%	Initial survey %
Aware of defibrillator	188	70%	53%
Unaware of defibrillator	55	20%	30%
Unsure	26	10%	17%

6 Sharing the kits

One of the new topics examined by the follow-up survey was the extent to which students passed the kits on to a second tier in their community. Ninety-three students (35%) reported that family members or friends had used the kit to learn CPR; three-quarters of these students were girls. An additional 226 people were trained, which means that the multiplier effect was almost 1 other person per student trained. Students who shared the kit shared it with between 1 and 8 other people, most students (42%) training 2 other people.

The second-tier learners were most likely to be parents or siblings of the student. Of the students who shared the kit, 68% reported that it was used by one or both parents, while 67% reported that it was used by one or more siblings, and 22% reported that the kit was used by a friend. For 3% of students the kit was used by a grandparent, and in 7% of cases the kit was used by other relatives or acquaintances of the student.

Figure14: Age distribution of second tier



The age profile of the second tier is shown in Figure 14. This group ranged in age from 6 to 85 years, clustering in two age groups – teenagers and 34–58-year-olds, which reflects the age profile of siblings and friends in one group and parents in a second group.

The percentage of students sharing in the kit varied greatly across schools. For example, in 3 schools, none of the students reported a family member or friend using the kit, whereas in another school all the students reported sharing it with at least 1 other person.

To examine whether training others was associated with knowledge retention, the data were analysed to determine whether there was a difference in knowledge score between students who shared the kit with others and students who did not. No significant difference was found (r = .002, p = .975).

7 Discussing the training with others

A new question in the follow-up questionnaire asked whether the kit had prompted discussion of the training at home or with friends outside of the Transition Year class. The question also asked students who answered Yes to explain the nature of the discussion.

Thirty-nine per cent of students reported discussing the training at home. The main themes of the conversations were categorised and are presented in Table 16. The most common themes surrounded how they would react if faced with a situation where CPR might be required and the importance of knowing CPR. Family members were also interested in the CPR course, as well as the kit and how to use it.

The data were analysed to investigate whether a link existed between discussing the training at home and knowledge retention, but students who discussed the training at home did not score any higher than students who did not (r = .102, p = .097).

Table 16: Themes discussed at home prompted by CPR training

	N
How to react in a medical emergency	19
Interest in/discussion of training	19
The kit and how to use it	17
Importance of knowing CPR	17
How to do CPR	11
Parents' approval of training	10
Family members' own knowledge of CPR	10
Family members expressing interest in learning CPR	8
CPR in general	7

Just 15% responded that the training had prompted discussion of CPR among friends outside of Transition Year. With friends, the discussions focussed mainly on the usefulness of the skill, the training session, and friends' interest in learning more about CPR (Table 17).

Table17: Themes discussed with friends prompted by CPR training

	N
Importance of knowing CPR	7
Interest in/discussion of training	7
Friends wanting to learn more	6
How to use the kit	3
How to do CPR	3
Whether they would do CPR in an emergency	4
Realism of training	1

8 Using the training

Five students reported finding themselves in situations in which they could have used their CPR skills. When asked to explain these situations, one student described a person unable to breathe after falling from a horse who was given CPR by a bystander until an ambulance arrived. Another described a boy being rescued from a lake but not needing CPR. Three respondents described putting an intoxicated or unconscious friend in a recovery position. It was not clear that CPR was given in these situations, but the transfer of knowledge and the skills link is useful.

9 Further training

Seven students (3%) were prompted to do further training as a result of CPR 4 Schools: 2 took first aid training, 2 were trained in using a defibrillator, 2 took lifeguard training, and 1 took a further CPR course.

10 Suggestions on improving the programme

Students were once again asked for their opinions on how the training might be improved. Over one-third (N = 102; 37%) offered suggestions. Table 18 lists the ideas proposed. Overall, students were looking for more – more involvement from experts, more time spent on training, more information on situations where CPR is used. The most common suggestion was to have a CPR expert give the training. The next most common idea was that more time be given to training – some suggested a longer session, others more classes. In a similar vein, students were also looking for refresher training. In terms of improvements to content, the most common suggestion was to give more information on situations where CPR is likely to be needed and examples of those situations. Students would also have liked the training to be more enjoyable or interesting. Most of these ideas were relatively new, arising after some time of reflection on these issues.

Table 18: Suggestions for programme improvement (follow-up) (N = 102)

	N
CPR programme	
Provide demonstrations or talks by experts	21
Provide more classes or spend more time on training	19
Train more or all students in CPR	9
Provide refresher training	7
Ensure that all students get a kit	7
Test CPR performance	3
Hold a CPR day	2
Make the training compulsory	2
Give certificates	2
Provide an excursion to train students	1
Course content	
Give more information & examples on situations where CPR is used	10
Make the training more enjoyable or engaging	8
Allow for more practice	4
Provide a more sophisticated DVD	3
Localise the DVD with an Irish voice	2
Have students write up a report on the programme	1
CPR in the community	
Encourage or make compulsory the home use of kits	4
Make the training more widely available	3
Provide a CPR information session for the community	1
Equipment and facilities	
Hold sessions with fewer students	5
Provide a bigger room	2
Improve the manikin	2
Reduce the number of kits per school	1

Thirty-eight students (14%) expressed satisfaction with the training without adding suggestions for improvement.

Discussion

CPR 4 Schools is the first standardised CPR training programme for post-primary school students in the country. The programme breaks new ground for CPR training in Ireland, using a self-instruction training model to improve the accessibility and effectiveness of instruction while reducing costs associated with training. Achieving the long-term goal of the programme – to substantially increase the proportion of the population trained in CPR – could be a major public health benefit. The results of this study substantiate the feasibility of this goal by validating the CPR 4 Schools programme as a means of incrementally training the school-going population. Additionally, the results underline the acceptability both of the skill and the method of training amongst teachers and students. While the findings expose some weaknesses in the programme's operation in its pilot phase, these can be addressed with the benefit of experience.

Feasibility of the programme

The programme was well received by both teachers and students. Teachers deemed it an effective training tool, and the vast majority confirmed that they would run the course again, which suggests they were well disposed to facilitating the training in their classes. The programme managed an extensive reach, training 62% of students surveyed in CPR for the first time.

From the results, we can identify four main issues that may have an adverse impact on the successful running of the programme:

1. Timing the deployment of kits to schools
2. Monitoring the implementation in schools
3. Teacher uncertainty of their role
4. Level of student non-participation

1. The one substantial obstacle to the implementation of the pilot programme was the deployment of kits late in the school year. The response rate of the initial student survey (a representative sample) indicates that at least one-third of schools did not run the training. In many cases, the training session was not scheduled in advance of the kit distribution, and when the kits did were delivered, many teachers struggled to find a slot in the timetable for the session. Several were unable to schedule the training and deferred it until the next school year, with a different group of Transition Year students. In some schools students had already left for the summer by the time the kits arrived. However, this problem can be addressed by having kits available from the start of the school year and enabling schools to order kits for delivery at a time that suits their timetable.

2. The absence of a system for gathering information on the implementation of the programme in individual schools is a limitation in the current operational model. While the IHF was assiduous in communicating with teachers and schools in the lead-up to the programme, no system of communication with schools after kits were distributed was put in place. Consequently, there is no means of gathering important tracking information for any specific school, such as whether the programme was run, when it was run, how many students were trained, and what proportion of the total were trained. While the current study provides aggregated data on the outcomes of the pilot programme, an ongoing programme that absorbs substantial funding requires a small amount of detailed school-specific information to be systematically gathered in order to assess whether the programme is achieving its goal. In addition, in light of the limited response to the current survey, a means of encouraging schools to submit the required information must be explored.

3. Comments from teachers and students suggest a lack of understanding by a minority of teachers of the programme's strategy and their role in it. For example, while most teachers appear to have been confident about facilitating the programme, some expressed concern over their ability or that of other teachers with no prior training in basic life support to conduct the session. This concern is inconsistent with the concept of a programme of self-directed learning and would not be expected from teachers who had 'bought in' to the programme. A degree of disconnectedness is also suggested by the indications that some schools ran the session using just the teacher's kit without waiting for the individual student kits to be delivered, as well as other schools keeping the kits for re-use with other classes. Some of the criticisms of the programme, such as questioning the value of a single training session or the simplistic presentation, reveal a lack of confidence in the efficacy of the kit. It appears that the IHF's efforts to inform teachers and schools about the programme were not entirely successful in getting teachers to take ownership of the programme, as was originally conceived.

   There is a case for providing some form of CPR expert support to teachers; this might take the form of enabling access to experts when they have a need for clarification. Alternatively, peer support might be effective in this context: teachers with CPR expertise might be enlisted to give backup to colleagues who have encountered difficulties in running the programme. In the longer term, it would certainly be worthwhile for the Department of Education and Skills to consider building CPR training into teacher training programmes.

4. Data from the student survey show that around one-third of Transition Year students did not take part in the programme. This is a high level of non-participation and may be explained by students' unavailability due to involvement in other activities or the CPR/first aid training being an elective module that they did not choose. Furthermore, a substantial number of students do not enrol for Transition Year. Not all schools offer a Transition Year and in those that do, it is not always compulsory. In 2007–08, 56,000 students completed the Junior Certificate; half of those students enrolled in Transition Year in 2008–09. This statistic suggests that the reach of CPR 4 Schools needs to broaden beyond Transition Year if the universal training of each new generation in CPR is to be achieved.

Feasibility of the kit

Effectiveness of training

Findings from the knowledge assessment are consistent with other research that has validated the effectiveness of the kit as a training tool. Students performed well on the assessment following training, with an average score of 85%, and nearly 70% of students correctly answered 7 or 8 questions out of 8. The weakest points in students' grasp of CPR were identifying the first step in the procedure (Q1) and the length of a rescue breath (Q7). The relatively high number of incorrect responses to the first point reflects a confusion over the sequence of steps at the start of CPR. The two distracters offered in the question corresponded to the two subsequent steps in the CPR procedure – checking for breathing and calling an ambulance. The moderate variation of scores on this question across most schools indicates that some level of confusion was present in all schools on this point.

Low scores on the question relating to the duration of a rescue breath are more difficult to account for. It is possible that the duration of breaths on the DVD was deceptive – arguably the actual breaths given appear to take longer than one second. However, the instructor on the DVD states five times that the breath should take 'about 1 second'. In addition, when the distribution of scores across schools is examined, students in some schools scored very well on the question while those in other schools scored quite poorly. This suggests that the low scores are related to some unknown factors that arose in specific training sessions.

Scores declined in the follow-up survey; however, this is consistent with other studies which have found that retention of knowledge and skills deteriorates over time. We must reiterate that this finding should be treated with caution as the identities of students were not linked across the two surveys. A more complex study would be required to link answers from the same individuals over a period of time.

The major decline was in the proportion of students scoring full marks, but students continued to retain a considerable amount of what they had learnt, scoring 75% of the total mark on average. Q1 and Q7 continued to be the most problematic questions, showing the greatest decline in correct answers. The number of correct answers to Q8, which asked about the number of presses and breathes in a CPR cycle, also fell considerably. Including other means of conveying the key steps of CPR in the course should be explored to diffuse the potential for confusion and to reinforce the learning points in the DVD. The problem of retention provides a strong argument for providing repeat training sessions at intervals during a student's remaining time at school.

Students who shared the kit or discussed it at home scored no better than students who did not, which suggests that revisiting the skill at home did not help reinforce the learning. This implies that the most effective learning environment is the formal school setup and provides a further argument for repeat training.

It is notable that a small number of students reported being in situations where CPR was used or where they considered using it (for example, concerning excess alcohol use), which indicates transfer of the skill from the classroom to a real-life context.

Suggestions for improvement

The suggestions for improvements provide insights into students' attitude to the training. Of those that completed that section of both questionnaires, most made positive statements, adding that no improvement was needed, which indicates that overall students were satisfied with the course and unfazed by the novel training method.

It is interesting that immediately after the course just one student felt that an instructor would improve the course, but reflecting six months later, 19 made the same suggestion. This and other suggestions for improvement – spending more time on training, giving more information on where CPR is appropriate, awarding certificates, for example – suggest that for students, as for teachers, the skill retained the aura associated with medical expertise, and that they were not entirely convinced that they could be trained adequately by a DVD in 22 minutes. More work needs to be done to convey the message that CPR is a simple push-and-blow technique that everyone should know, like swimming or riding a bike. For that reason, it is perhaps not appropriate to test students or award certificates, as suggested by some.

At the same time, the request for more training, more information, and more practice should be heeded. These requests were made more strongly in the follow-up survey, which suggests that after six months students recognised their recall of what they had learnt as imperfect. As the training focussed on the physical skill, students may well have a poor understanding of why a person would collapse and stop breathing. While such knowledge does not enhance ability to perform CPR, context is important to understanding a skill and retaining it. Such understanding might also give students more confidence about using CPR. A better balance may need to be struck between giving students the reassurance that they have been told all they need to know and avoiding distracting them from the skill being taught. The request for more practice should be taken seriously as it indicates that some students may have left the class feeling that they had not mastered the technique.

The well-intentioned suggestions from both teachers and students that training be extended to more students or to the whole community is in fact the ultimate aim of the programme. The larger plan behind the programme – to incrementally train the population in CPR skills – as well as the concept of the chain of survival should be communicated to teachers and students so that they have a better understanding that the training fits into a nationally significant strategy. This information was contained in the newsletter sent to teachers, but perhaps was not dealt with in sufficient depth; in addition, it might not have reached all students. It might also be useful to inform teachers and students of the thinking behind the use of kits to address the tendency to joke at the non-Irish voice, the basic presentation, or the lightweight manikins. Understanding that the kits have been developed and approved by the American Heart Association as a low cost but effective means of mass training in this valuable skill might dispel intolerance of certain features of the kits, while understanding the concept of self-directed learning might lead students to appreciate that mastery of the skill is in their own hands.

Some respondents to the follow-up survey thought that the training could be more enjoyable or interesting, although this was not a suggestion made in the initial survey. The comment is surprising given that the training was a focussed, practice-based class that required students' full participation, and given teachers' feedback indicating high levels of student engagement.

Unfortunately the survey does not yield enough information to enable conclusive interpretation of such comments. Perhaps some students were not fully involved in the training session, which might occur if the class were large. Some did voice discomfort with having to perform in front of a large group, although if all were practising simultaneously, no-one should have felt exposed to peer scrutiny. However, this situation may have arisen in schools where a single manikin was used in the session. The optimal classroom setup should be identified and guidelines established for teachers so that all students can be engaged fully and not discomfited by the practice element of the session.

Teacher endorsement of the kit

The innovative training method received the endorsement of teachers. The provision of all materials in a single kit – and the manikin in particular – streamlined the delivery of the training, which reduced lesson planning and preparation of materials. The combination of concise instruction and substantial hands-on practice engaged students and maintained their interest for the duration of the training session. It is notable that few teachers complained of the novelty of the manikin leading to disruptive behaviour, which might have been expected. The few problems teachers experienced with the kits can be addressed by developing the support and communication channels to teachers.

Acceptability of CPR

Clearly resuscitation skills are regarded as a useful skill for students to have. A demand for training exists in schools, with over 10,000 Transition Year students in the 109 schools in the teacher survey having already been trained in basic life support in the five years previous to CPR 4 Schools. The increased awareness amongst students of defibrillation equipment in their communities between the initial survey and the follow-up indicates that the training may have improved recognition of the community role in saving lives from cardiac arrest.

Acceptability amongst teachers was borne out by the positive response from those who participated in the survey, with nearly all confirming the success of the course. They were virtually unanimous in considering the initiative a valuable learning experience for students and CPR a worthwhile skill for students to have. Several also endorsed the idea of the training encompassing a second tier in the community.

Student acceptance of CPR was expressed through the large majority who reported an increased confidence to perform CPR, a willingness to perform CPR in an emergency, and a readiness to pass the skill. However, acceptance was not unequivocal in the student cohort; a substantial minority was uncertain about responding or unwilling to respond in an emergency, and just one-third shared the kit with others.

Responding in an emergency

Around one-quarter of students who participated in the first survey expressed hesitance or unwillingness to perform CPR in response to a sudden collapse. It appears that despite

students achieving a good knowledge of CPR procedures (as reflected in the knowledge scores) and increased confidence to perform CPR, attitudinal barriers to responding remain for some. Further analysis showed that lower scores corresponded to increased reluctance to give CPR, which implies that a proportion of students lack motivation to take the role of first responder in an emergency. The follow-up survey indicated that as the 'feel-good' experience of the training receded in time and knowledge decreased, reluctance to give CPR increased, with 41% at follow-up hesitant or unwilling to respond. This motivational deficit might be attributed to immaturity, but the literature provides evidence that CPR-trained adults frequently do not attempt resuscitation (Swor et al., 2006). Fear of failure is the most common reason given for failure to act. The intimacy, and possible unpleasantness, of mouth-to-mouth resuscitation may also underlie students' disinclination (Vaillancourt et al., 2008) – one teacher noted students' squeamishness about performing mouth-to-mouth on a manikin.

While somewhat discouraging, these findings suggest that giving CPR might be regarded more positively if it were brought 'closer to home'. Students themselves in the follow-up survey expressed a wish for a more real-world context in which to understand the skill, asking for more real-life examples and scenarios. The question presented in the questionnaire described an emergency in a public place, which possibly reinforced the perception of bystander CPR as a procedure that is necessarily performed on a stranger. Indeed, in the account of a real-life bystander CPR intervention on the DVD, the woman who had the cardiac arrest and the bystander who witnessed it were strangers to each other. However, most cardiac arrests occur in the home, so we might infer that if students were to witness a cardiac arrest, they would be more likely than not to know the person needing resuscitation. Reluctance to perform resuscitation on family members and friends is uncommon, but it increases considerably when the recipient is a stranger (Locke et al., 1995; Axelsson et al., 2000).

In addition, the programme does not tackle motivational barriers such as fear of failure or distastefulness. It may be prudent to address these matters in any future implementation of the programme. Negative perceptions of giving CPR might be reduced, for example, by relating the experiences of people who have provided CPR, which in most cases are positive (Vaillancourt et al., 2008). Any real-life experiences of students themselves, in which they used or considered using the training, could be integrated into subsequent classroom sessions as a further motivational technique.

Sharing the kit

Around one-third of students reported in the initial survey that they were doubtful about showing others how to do CPR or unlikely to do so, and only one-third reported sharing the kit with a family member or friend after six months. Little more than one-third of students even discussed the training with their family, although those discussions that did take place were positive about the training and skill. (That just 15% discussed the training with friends outside Transition Year is not so suggestive of disinterest as it first might seem – for many students, their circle of friends is confined to their class.) These findings suggest that for many students enthusiasm for the training did not extend so far as inducing them to share it. Reluctance to train others is probably attributable in part to self-consciousness, which tends to be heightened during later adolescence. Or it may represent a lack of conviction regarding the

dissemination of the skill; after all, the course focuses on training students in the skill and not as CPR advocates. The variation across schools indicates that some teachers may have been more effective in encouraging students to share the kits at home or generally stimulating enthusiasm around the project.

The multiplier effect, at less than 1 other person per student trained, was much poorer than in the Danish or Norwegian studies, where it was 2.5 and 2.9 per student trained respectively. The school children in those studies were younger than students in the current study, and younger children probably feel less awkward about demonstrating the kit to family members. If the programme is to continue aiming to have a multiplier effect, a more concerted effort must be made to enlist students in the endeavour. It is a new concept – students are rarely, if ever, asked to share what they have learnt with others. It might help to inform parents in advance of the programme, its goal and the purpose of the kit, so that students aren't required to introduce and explain the concept at home. Students might also be more at ease if they are simply expected to give the kit to family and friends rather than demonstrate its use.

Differences between girls and boys

Immediately following training, girls performed better than boys in the CPR knowledge assessment and were more positive in the three measures of acceptance of CPR. Three-quarters of students who passed the kit to family and friends were girls. Such findings suggest that girls internalised the training to a greater extent than boys. However, girls' responses were less stable than those of boys, with both knowledge of CPR and willingness to perform CPR declining more amongst girls after six months.

The data gathered in the student survey are insufficient to provide reasons for the gender differences and the different rates of change in knowledge and attitude. Research has not to date addressed adolescent gender differences in CPR skills acquisition and attitudes to CPR. The literature contains some examination of gender differences among adults. Men have been found to be more confident in their ability to give CPR and more willing to perform CPR on strangers (Axelsson et al., 2000). On the other hand, one study has found women to be more likely to be successful in the learning skill (Dracup et al., 1989), while another found men and women to be equally capable (Van Kalmthout et al., 1985). Whether such findings are applicable to teenagers is open to question, however. The gender differences revealed by the current study may be attributable to differences in maturity, which may affect attitudes towards helping behaviour as well as knowledge acquisition. The higher knowledge scores among girls are consistent with the better exam performance of girls in second-level education in general. However, this does not help to account for the convergence of scores amongst high-scoring girls and boys after six months. It may be attributable at least in part to the fact that different groups of students responded to the two surveys, and the different proportions of boys and girls in the two survey groups.

Conclusion and Recommendations

CPR 4 Schools is an effective programme for training students in CPR that, with the correct supports, can feasibly be extended to all post-primary schools. The programme has the potential to introduce widespread resuscitation skills in the population, along with enhancing public knowledge of and attitudes towards CPR, which could have long-term health benefits for the population. The programme's use of personal self-instruction kits enables the training of large numbers of school-going children at relatively low cost and reduced administration.

In this section, recommendations for the programme are outlined in two parts. The first set of recommendations comprises measures aimed at enhancing the programme through improvements in implementation, building upon student learning experiences, and developing more positive attitudes towards giving CPR and sharing the skill. The second set of recommendations addresses the broader social aims of the programme: mainstreaming CPR training to gradually develop CPR competence in the population and sustaining the programme into the future.

I Recommendations: Programme improvements

Recommendation 1.1: Develop a comprehensive, multifunctional CPR 4 Schools website.
A website would provide an effective means of automating operational aspects of the programme as well as providing support to teachers and students. Anecdotal reports from administrators of similar self-directed learning programmes in Norway and Japan suggest that a well-run website is a major asset to such programmes.

The website would address the following operational issues:

1. **Providing the means for schools to take charge of implementing the programme**
   The major weakness of the programme was the late delivery of kits and the consequent problems of timetabling. A website could provide the facility for schools to order the number of kits they required online and have them delivered at a specified time. Training could then be timetabled well in advance at a time suitable for teacher and students.

2. **Monitoring the implementation of the programme in schools**
   Data must be gathered on the implementation of the programme in each school – for example, when the training was run and how many students completed it. Automating the process electronically would simplify data gathering, and additional features to aid data gathering could be built into the system, such as a reminder feature that would e-mail teachers to submit this information.

The website would help in addressing the following informational gaps of the programme:

3. **Providing support for teachers**
   Support must be provided for teachers so that they are confident about running the programme and are equipped to deal with student queries. A website could act as the first source of support, providing comprehensive information to teachers and enabling them to submit queries online. Perhaps a network of experts could be accessible through the site. Having resources available online would avoid the necessity of taking teachers out of the classroom for information sessions.

4. **Providing additional material for students**
   Recommendation 1.3 below proposes that additional background and learning materials be provided for students. Rather than covering all this material in class, which would threaten to expand the course duration beyond an acceptable limit, much of it could be offered on the website. The student age group is enthusiastic for Web-based experiences and directing them to an online source might aid in maintaining their interest once the class was over. Innovative approaches to reinforcing learning could be explored, including linking to YouTube videos or exploiting mobile phone messaging. An online forum or FAQ could answer students' questions.

It is worth emphasising that the website must be run according to the standards of a commercial website in order to maintain the confidence of users. In addition, materials developed for teenagers must be designed to attract and engage this very specific target audience.

Recommendation 1.2: Improve links with schools.
Stronger relationships should be established with key staff in schools so that CPR training is regarded as a school-wide endeavour. School principals and school secretaries, and the teacher who runs the training, should be involved in programme planning. If all knowledge of and responsibility for the programme rests on one individual, the whole programme could be left in limbo if that individual were absent or on leave during the school year.

Recommendation 1.3: Develop the content of the course to aid knowledge retention and to improve motivation and confidence to perform CPR.
The learning experience for students needs to be developed to reinforce the instruction given in the DVD and to address issues of student motivation and confidence. The most effective formats and delivery media for these additional learning materials should be investigated.

In relation to aiding knowledge and skill retention, the following measures should be considered:

1. **Include material that clarifies the sequence of the steps in the CPR procedure.**
   Students were confused about the order of the initial CPR steps. Different means of clarifying the steps and enabling students to memorise them should be devised – for example, a mnemonic that they could recite, a quick-reference sticker that could be stuck to a copy-book, a poster to hang in the classroom, or even an 'earworm', a song that would stick in their heads.

2. **Include a quiz at the end of training, giving immediate feedback and providing correct answers.**
   A quiz can be an entertaining means of reinforcing learning and would help clear up any lingering confusion that might exist about the CPR procedure. This should not be treated as a test of students' knowledge, however.

The following measures should be considered to improve students' motivation and confidence to perform CPR:

3. **Inform students of the background to the I**
   All students should be aware of the wider context of the training – the number of SCDs in Ireland each year, the percentage that take place at home, the chain of survival, and the critical role of CPR in improving survival rates.

4. **Emphasise the home context of CPR and provide examples of positive experiences of giving CPR.**
   Real-life examples recounting the experiences of people who had cardiac arrests as well as of people who had given CPR would help normalise the act for students. The 'real-life' account of bystander CPR given in the DVD seems to be delivered by actors and is unlikely to improve the motivation of astute young people. Openly dealing with motivational barriers such as fear of failure and distastefulness might help to remove them.

5. **Provide more information on cardiac arrest.**
   While the causes of cardiac arrest are peripheral to learning the skill of CPR, students had a need for more context around CPR and expressed uncertainty about the types of situation where CPR might typically be performed – on an unconscious drunken friend, a person rescued from drowning, an athlete collapsed on a playing field? Giving students a wider perspective would aid their confidence about knowing when to perform CPR as well as providing the necessary context for understanding the skill.

6. **Emphasise that CPR is a simple skill.**
   The message that CPR is not an esoteric skill best left to experts must be strongly communicated to students. Otherwise, the course is merely a spectacle, engrossing but not demanding anything of the students themselves.

7. **Provide information on the kits and the concept of self-directed learning.**
   Confidence in the mode of learning should be instilled in students. The source of the kits as well as the concept behind them should be conveyed to students. In addition, the concept of self-directed learning should be explained so that students recognise their responsibility to take a more independent approach to learning in this context.

Recommendation 1.4: Set a specific amount of time for practice by each student.
Practice is a critical element of the training; ensuring that students get enough practice cannot be left to chance. Every student should leave the classroom confident that they can carry out the procedure according to the guidelines they've been taught.

Recommendation 1.5: Provide guidelines for teachers on classroom setup and session duration.
Guidelines will enable teachers to optimise the learning environment for all students. Setting a maximum number of students per session will decrease the likelihood of students disengaging or behaving disruptively. Guidance on the size of classroom will avoid students being too crowded to practise effectively, while advising teachers to test the DVD will ensure that technical problems can be addressed prior to the class.

Recommendation 1.6: Build refresher training sessions into the programme.
Retention of knowledge and skills will diminish over time regardless of the quality of the initial training. It is important that the programme be extended to include refresher training sessions after the initial training. A yearly refresher session focussing just on revising and practising the skill would ensure that the benefits of the initial training were maintained.

Recommendation 1.7: Promote the multiplier effect.
The relatively low level of kit use by those within the students' circle should be addressed if the training is going to have an wider impact outside of schools. At the very least, measures to ensure the following should be put in place:

1. **All students are aware of the goal to spread the skill in their communities and their role in achieving that goal.**
   This may not have been fully communicated to students in the pilot programme.

2. **Students are actively encouraged to share the kits.**
   A means of encouraging students to want to share the kits will require some thought. It might be possible to develop a goal-based mechanism to provide a stronger focus for this aim. For example, a league might be established either within schools or between schools in which teams of students compete to see which team passes the training on to the most people in their communities.

3. **Parents are included in the target audience for future information campaigns.**
   If parents are already aware of the programme and interested in it, one hurdle for students is removed.

II Recommendations: Programme expansion

Mainstreaming

Recommendation 2.1: CPR training should be implemented on a mandatory and standardised basis in the second-level school curriculum.
To achieve a population-wide effect, CPR training must reach all students at some point in their second-level education, in which case it must be mandatory. The experience of other countries that have attempted similar programmes is that an optional training programme will be offered by just a proportion of schools. In addition, a single standardised and validated training programme should be implemented in order to ensure quality and consistency of approach. The agreement of the Department of Education and Skills would be required to implement training on this basis.

The stage in second-level education at which students are trained in CPR needs to be considered further as Transition Year presents the problem of student non-participation. While this study cannot make recommendations on which stage is most suitable, the options are as follows:

- *Transition Year:* While there are several advantages to training at this stage – students are mature and free from state exams, and the skill is consistent the philosophy of the Transition Year curriculum – alternative arrangements would have to be made for students who bypass Transition Year, which would complicate the implementation of training.
- *The first year of the Leaving Certificate programme:* CPR training might possibly be incorporated into the Social, Political and Health Education (SPHE) programme, which is proposed as a compulsory element of the senior cycle, although the practical nature of the skill might not fit well with the subject's focus on personal well-being. Alternatively, it might be built into Physical Education or offered as a standalone course.
- *The junior cycle:* Research has found that 12–15-year-olds are as capable of learning CPR as adults, and other countries have found that children aged 12 and 13 years are more enthusiastic about learning CPR and sharing the kits than older teenagers. The multiplier effect resulting from training 15–17-year-olds in this study was unimpressive; if training a second tier continues to be a key objective of CPR 4 Schools, younger students might be more effective in achieving it. In addition, there is less pressure of exams on students in the junior cycle than those in the senior cycle. As with the senior cycle, training might be incorporated into SPHE or PE or might be offered as a standalone course.

Sustainability

Recommendation 2.2: A coordinator or coordinating team at national level must be established to support and administer the programme.
CPR 4 Schools is unlikely to be self-sustaining, and while each school might take ownership of its own running of the programme, a coordinator at national level is needed. This coordinator might be an individual or a small team depending on the workload. The role of the coordinator would include establishing and maintaining the website, arranging for the import and

distribution of kits, providing support to teachers, providing information to schools, students and parents, and monitoring the programme. The coordinator would be responsible for programme development and managing the development of supplementary materials. The coordinator would also be responsible for maintaining the momentum of the programme by 'evangelising' its merits each year with each new set of students.

A home for the programme and the coordinator must be decided. While the IHF does not have the resources to establish the coordinating role within its own organisation, it is willing to support the coordinator and to provide the cardiac expertise to keep the programme up to date with developments in the area. It is beyond the scope of this study to recommend an organisation that should take ownership of the programme, but in the absence of resource-rich voluntary organisations in this country, a government department would seem to be the inevitable choice – the Department of Education and Skills, the Department of Health and Children, or one of the agencies that come under the remit of those departments, such as the Second Level Support Service, the SPHE Support Service or the HSE Population Health Directorate.

The question of ownership is associated with the question of funding the programme. The IHF is not in a position to fund the programme beyond the pilot stage. While CPR 4 Schools is a much lower cost training model than instructor-based models, it still incurs considerable costs associated with administration and the purchase of kits. In addition, developing the programme, as recommended in the previous section, will add to costs.

In relation to the kits, students themselves (or, in effect, their families) might cover the cost. It is conceivable that the kit might be added to each student's booklist. At €25 per kit, the price is within the price range of school books at second level. However, the kit would increase the already high cost of a student's school books for the year. At the same time, the purchase of just one kit per family would be necessary, and training might save the life of a family member some day. Schools are a less likely source of funding as it would be quite costly for schools to fund the purchase of kits every year – for example, it would cost approximately €1,500 for 60 kits.

Given the long-term public health benefit of the training as well as the valuable life skill given to students, there is a strong argument for funding or subsidy from the State, even in spite of current spending constraints. Funding programmes and other sources of State funding should be examined further as well as possible partnerships between State entities. For example, the SPHE Support Service is a partnership between the Department of Education and Skills, the Department of Health and Children and the HSE, and is funded by the National Development Plan.

Some level of community sponsorship might be forthcoming in light of the importance of strengthening the chain of survival in communities. Corporate sponsorship should also be explored. Several companies have established corporate social responsibility policies, and those operating in the medical and health sector in particular might be disposed to wholly or partially fund the programme. In Canada, the ACT Foundation builds partnerships between schools and businesses at a community level as a means of financing CPR training in schools. However, ACT's model is instructor-based, so equipment is reused every year. A model based

on personal kits requires the equipment to be bought every year. How amenable schools might be to regular fundraising for CPR training is another issue.

There are, therefore, a number of options for the ownership and funding of the programme that need to be examined by stakeholders including the IHF, government departments, and representatives from schools and parent groups.

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Appendix A: CPR Newsletter

The newsletter sent to teachers with the sample kit is shown below.

IRISH HEART FOUNDATION

Welcome to our CPR 4 Schools Newsletter

CPR 4 Schools

FEBRUARY 2009

Dear Transition Year Teacher,

Save a heart, Save a life

You have now received your CPR Anytime Kit. Over 300 transition year schools have signed up to the *CPR 4 Schools* progamme. Our aim is to train all transition year students - more than 27,500 - in the skills of CPR and turn them into potential lifesavers in emergency situations.

The initiative is a very positive step towards our vision of training 80,000 people all over Ireland in CPR lifesaving skills. This easy-to-use, self explanatory kit is proven to be effective in training the general public in basic lifesaving skills. A recent (2005) study showed that each CPR Anytime kit trains an average of 2.5 persons. This was based on findings from a project which distributed 35,000 CPR Anytime Kits to 12-14 year olds in Denmark.

CPR in the Classroom

Over the next few weeks we ask that you familiarise yourself with the kit. Once used in the classroom, students can bring the kit home and encourage their family members to learn the simple skill of CPR. On Page 2, you will find useful information and advice from Brigid Sinnott in our resuscitation department, on how to run the programme in your classroom.

Happy Heart Weekend

We believe *CPR 4 Schools* is an exciting project and we are asking for your help to ensure its success. As the national charity fighting heart disease and stroke, we depend on public donations for 90% of our income. We need your students to help us fundraise over *Happy Heart Weekend on 14th, 15th May 2009* to help pay for the kits.

In particular we are asking you to help us:

- Organise a rota of students to cover the shopping hours at your local centre
- Allocate buckets, t-shirts, boxes or hearts to each student
- Liaise with the shopping centre manager and supervise the students on the day
- Lodge the monies raised to the Happy Heart Weekend account

If your School has not yet registered for *CPR 4 Schools* call Niamh Brady on 01 6346909 or email nbrady@irishheart.ie

Our Regional Fundraisers will be in touch with you to discuss how your students can help us fundraise at a location near you. They are also more than happy to answer any questions you may have. See back page for contact details.

CPR 4 Schools in Your Classroom

What you need:

- An area where students can kneel down on the floor.
- A large TV with a DVD player or a projector and laptop.
- Students will need to have a clear line of vision of the screen.
- Use a DVD from the student packs (IHF branded) as this will be an updated version.

Running the CPR programme:

- You can run the CPR modules over a few class times.
- OR you can complete the full course in a double class.
- Once the DVD starts to play there is no need to stop it until the module is complete.
- No prior knowledge of CPR is required to run this class.
- The CPR kit is a complete package - the DVD will guide the student through all the steps of CPR.
- A small manual is included as a reference and each student receives a Mini Ann manikin, which allows them to practise their skills.

It is very important that skills are practised.

Moyne Community School with their CPR Kits

The kits can be used over and over but we advise that it is only used within the student's family members to eliminate any possibility of cross contamination.

Commonly asked questions:

Can I do harm while doing CPR?
No. It is better to do CPR on someone who doesn't need it than do nothing for someone who does.

Can I be sued?
Internationally there are no recorded instances of suing as a result of performing CPR. Remember you are rendering assistance to the best of your ability to someone who is unresponsive. It is very hard to do damage or make the situation any worse.

Does learning CPR from the kit really work?
Yes. CPR is a very simple skill and this self-directed kit is proven as an excellent way to learniit. But like any skill, CPR can be improved with practise and repetition.

What happens if I perform CPR incorrectly?
CPR is only performed on people who are unconscious and not breathing. In these cases, it is highly unlikely to cause any further deterioration to a condition by performing CPR.

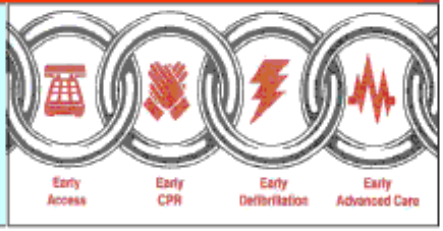
Where can I go for more training or information on CPR and defibrillation?
Check out our website www.irishheart.ie or www.americanheart.org.

We will be evaluating this project and we would really appreciate your assistance in completing our evaluation forms.

Please note:
The kit you received is the original kit from the American Heart Association. The kits received by students will have been amended to reflect Irish details such as emergency numbers - 911 will be changed to 999.

Thank you

Bystander CPR Saves Lives. At a time where every second counts, we can improve survival rates by increasing the number of people trained in CPR. We can achieve our goal of saving lives and strengthening the Chain of Survival – a concept based on four vital links to save a life.



HEART NEWS

Saving lives...in a heartbeat

Imagine the fear of seeing a person collapse... and not knowing what to do.

Over Happy Heart Weekend 2009 we are raising money to fund our new *CPR 4 Schools* programme and train 27,500 Transition Year students in lifesaving CPR skills. This skill could save more lives every year.

Noirin Duggan from Co Tipperary

was just 18 years old when she collapsed suddenly.

Now 23, Noirin says she wouldn't be here today if it wasn't for bystander CPR.

She said: "I collapsed just before an exam and I was out cold for 19 minutes. **My parents were told I would never wake-up."**

Noirin told us how she had been feeling unwell for a few weeks leading up to her exams, but her doctor thought it was a gastric problem.

Surprisingly on the day of the exam, she felt okay—so she didn't think twice about walking a large flight of stairs. But not long after, she collapsed in the exam room.

Thankfully a college student immediately started performing resuscitation skills on Noirin known as CPR (cardiopulmonary resuscitation), assisted by a second student who counted the compressions and called an ambulance.

Noirin said: **"My heart stopped three times in the ambulance** and each time the paramedics had to bring me back.

"If the girls had not performed CPR on me, there would have been no-one for the paramedics to save. I am living proof that bystander CPR works."

Every month in Ireland about 400 people suffer a cardiac arrest. On average, only four people survive.

At the Irish Heart Foundation, we want to turn transition year students into lifesavers… because with 27,500 more people equipped with CPR skills, we will save lives every single year.

About 70 per cent of cardiac arrests happen in the home and in the presence of a family member or friend. It's simple—**the more people who know CPR, the more lives we can save.**

Our plan is to train 27,500 transition year students in the lifesaving skill by providing them with easy-to-use CPR kits.

The Anytime Kits will enable students to learn CPR in under 30 minutes. Each kit comes with a mini manikin, an instructional dvd and a booklet, which the student can use again and again to pass on their skills to family and friends.

For every €25 we receive, we can train another Transition year student and save more lives.

The CPR Anytime Kit

We Provide the Following Support for Happy Heart Weekend

Your Regional Fundraiser will provide you with all the necessary support for Happy Heart Weekend. This includes:

- Garda Permits
- Shopping centre permissions
- Insurance cover
- T-shirts, buckets and hearts
- Posters & sponsorship cards

We understand some schools may be busy with work experience placements or assessments over Happy Heart Weekend.

However we ask that each school fundraise in any way they can! Our regional fundraisers have plenty of experience and would be delighted to help you organise an event in the your school.

CPR 4 SCHOOLS

Find your Regional Manager from the list below:

IRISH HEART FOUNDATION

Head Office Tel: 01 6685001
Website: www.irishheart.ie
Patient Helpline: 1890 432 787

4 Clyde Road
Ballsbridge
Dublin 4

Munster: *Cork, Kerry, Limerick, Clare, Tipperary*
Call Anne Riordan on 021 4505822
Email ariordan@irishheart.ie

South-East: *Waterford, Kilkenny, Wexford, Carlow, Laois, Offaly*
Call Tracy Power on 087 2800995
Email tpower@irishheart.ie

North-West: *Mayo, Roscommon, Sligo, Leitrim and Donegal*
Call Frances McAndrew or Mary Tighe on 071 9171002
Email mtighe@irishheart.ie

North-East: *Meath, Westmeath, Longford, Cavan, Monaghan, Louth*
Call Mairead McMeel on 042 966 4623
Email mmcmeel@irishheart.ie

South Dublin & Wicklow
Call Jennie Blake on 086 0483722
Email jblake@irishheart.ie

North Dublin & Kildare
Call Mary Gamble on 086 3806941
Email mgamble@irishheart.ie

For more information on *CPR 4 Schools* or to register for the programme check out our website www.happyheartweekend.ie

HAPPY HEART WEEKEND
14th, 15th , 16th May 2009

Appendix B: Survey Questionnaires

Teacher questionnaire

CPR 4 Schools Evaluation Study

Transition Year Teacher Questionnaire

This study is being conducted by a research team in the Royal College of Surgeons of Ireland. The principal investigator is Prof. Hannah McGee and the main researcher is Helen Burke. Contact details: phone (01) 402-2725; e-mail helenburke1@rcsi.ie

To be completed by the Transition Year teacher

Section I: Your School

1. What type is your school?

   ☐ Secondary ☐ Vocational/community college ☐ Comprehensive/community school

2. Is it ...?

   ☐ Single sex – girls ☐ Single sex – boys ☐ Mixed sex

3. What is the approximate number of students? _____ students

4. Would you describe the place where your school is situated as being …?

   ☐ In open country ☐ In a village ☐ In a town (1,500+)
   ☐ In a city (other than Dublin) ☐ In Dublin city or county

5. How many students are in Transition Year? _____ students

Section II: CPR Training in Your School

6. How many students participated in the training? _____ students

7. How long did the training session take? _____minutes

8. In the last 5 years, has your school participated in any other CPR training activity?

   ☐ Yes ☐ No ☐ Don't know

9. If Yes, please answer the following questions:

   (a) Was the training provided by ...?

   ☐ A voluntary organisation/charity (e.g., Civil Defence, Order of Malta, Red Cross); please specify: _____

   ☐ A commercial training organisation; please specify: _____

   ☐ A local hospital

   ☐ Other; please specify: _____

   (b) What classes were trained?

   ☐ First Year ☐ Transition Year

   ☐ Second Year ☐ Fourth/Fifth Year

   ☐ Junior Cert ☐ Leaving Cert

   (c) How many students in total were trained in the last 5 years approximately? _____ students

10. We are interested in your observations on this training course. Do you think it went well?

    ☐ Yes ☐ No ☐ Unsure

    If No, please outline any possible reasons for this:

    _____

    _____

    _____

    _____

    _____

11. Would you run this course again next year?

☐	☐	☐	☐	☐
Yes, definitely	Yes, possibly	Not sure	Unlikely	Definitely not

Please give reasons for your response:

_____

_____

_____

_____

_____

12. Did you experience any difficulties in administering this course?

☐ Yes ☐ No

If Yes, please give details:

_____

_____

_____

_____

_____

13. Any other comments?

_____

_____

_____

_____

_____

Thank you for your time.

The questions below were included at the beginning of the questionnaire sent to teachers in the 40 schools that took part in the student survey. Note that question 6 in the original version of the teacher questionnaire was moved and is listed as question 2 below.

Section I: Administration

Please start by completing the following information on the survey of students.

1. Number eligible to complete the questionnaire
   (i.e. over 16 years and present at the training): _____ students

2. Number who completed the CPR training: _____ students

3. Number who completed the questionnaire: _____ students

Initial student questionnaire

CPR 4 Schools Evaluation Study

Transition Year Student Questionnaire

This study is being conducted by a research team in the Royal College of Surgeons in Ireland. The principal investigator is Prof. Hannah McGee and the researcher is Helen Burke.
Contact details: phone (01) 402-2725; e-mail helenburke1@rcsi.ie

To be completed by students

Now that you have completed CPR training, we would like you to fill out this short questionnaire.

1. Age: _____ years

2. Sex: ☐ Male ☐ Female

3. Type of school: ☐ Single-sex ☐ Mixed

4. Have you received any previous CPR training? ☐ Yes ☐ No

   If Yes, who provided this training?

   _____

What would you do if you found someone who had collapsed? In the questions that follow, please tick the answer that you think is correct. Tick only one box per question. If you do not know an answer, tick the box that you think is most likely to be correct.

5. What is the first thing you should do if you come across a collapsed person?

☐ Call an ambulance

☐ Try to get the person to respond to you

☐ Check to see if the person is breathing normally

6. When calling an ambulance what telephone number would you use?

☐ 911

☐ 999

☐ 118118

7. Why would you shake and shout at a collapsed person?

☐ To open the airway

☐ To restart the heart

☐ To check for response

8. What action would you use to open the person's airway?

☐ Tilt the head back and lift the chin

☐ Tilt the head and push the chin down

☐ Tilt the head down and turn the chin to the right

9. When assessing a person's breathing, what do you look at?

☐ Their chest

☐ Their eyes

☐ Their nose

10. When assessing a person's breathing, where and what do you listen for?

☐ Listen over the mouth/nose for breath sounds

☐ Listen over the chest for breath sounds

☐ Listen over the chest for a heartbeat

11. When giving breaths, for how long do you breathe into the person's mouth?

☐ 1 second

☐ 5 seconds

☐ 10 seconds

12. How many presses and breaths would you give per cycle of CPR?

☐ 30 presses and one breath

☐ 30 presses and two breaths

☐ 30 presses and three breaths

13. Thinking about if you were in a public place and no-one else was there to help: how likely would you be to start CPR with someone who had collapsed?

☐	☐	☐	☐	☐
Definitely would not give CPR	Probably would not give CPR	Unsure whether I would give CPR	Probably would give CPR	Definitely would give CPR

14. Has this training programme changed how confident you are that you could perform CPR if you needed to? Are you …?

☐	☐	☐	☐	☐
A lot more confident	A little more confident	No change	A little less confident	A lot less confident

15. Do you think you will show family or friends how to do CPR?

☐ Yes ☐ No ☐ Unsure

16. (a) Is there a place you visit regularly that has heart-related life-saving equipment (e.g., a defibrillator)?

☐ Yes ☐ No ☐ Unsure

(b) If Yes, how near is it to your home?

☐ Within about 100 metres

☐ Within a half mile

☐ Within a mile

☐ Further than a mile from home

☐ Don't know

17. Do you have any suggestions for how we could improve this programme?

_____

_____

_____

_____

_____

Thank you for your help.

Follow-up student questionnaire

CPR 4 Schools Evaluation Study

Transition Year Student Follow-up Questionnaire

This study is being conducted by a research team in the Royal College of Surgeons in Ireland. The principal investigator is Prof. Hannah McGee and the main researcher is Helen Burke.
Contact details: phone (01) 402-2725; e-mail helenburke1@rcsi.ie

To be completed by students

This questionnaire is about the CPR training that you had in April or May 2009. We are interested in the effects of training on you, your family and friends.

1. Age: _____ years

2. Sex: ☐ Male ☐ Female

3. Type of school: ☐ Single-sex ☐ Mixed

4. Did you fill out a questionnaire in April or May 2009 when you first completed the CPR training?
   ☐ Yes ☐ No

5. (a) Has anyone else used your kit to learn CPR in the meantime (e.g. family or friends)?
   ☐ Yes ☐ No

   (b) If Yes, how many people used it? _____

(c) If Yes, who used it? In the table below, please identify the relationship of each person to you by ticking the appropriate checkbox and then write in their age (or best guess at their age if not completely sure). Use one row per person.

Person	**Relationship**	**Age**
1	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
2	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
3	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
4	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
5	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
6	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
7	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
8	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
9	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	
10	☐ Parent ☐ Grandparent ☐ Brother/sister ☐ Friend ☐ Other, please specify: _____	

6. Did you have any situation since your training where you could have used or did use your CPR skills?

☐ Yes ☐ No

If Yes, please describe what happened and what you did:

_____

_____

_____

_____

_____

7. Did you do any further training because of the CPR 4 Schools training?

   ☐ Yes ☐ No

   If Yes, please explain:

_____

_____

_____

_____

8. Did the kit prompt any discussion of CPR at home or among friends outside of your Transition Year class?

   (a) **At home:** ☐ Yes ☐ No

   If Yes, please explain:

_____

_____

_____

_____

(b) **With friends:** ☐ Yes ☐ No

If Yes, please explain:

_____

_____

_____

_____

9. Do you have advice on how CPR training in schools could be improved in 2010?

_____

_____

_____

_____

_____

The next questions are about what to do if you found someone who had collapsed. Please tick the answer that you think is correct. Tick only one box per question. If you do not know an answer, tick the box that you think is most likely to be correct.

10. What is the first thing you should do if you come across a collapsed person?

☐ Call an ambulance

☐ Try to get the person to respond to you

☐ Check to see if the person is breathing normally

11. When calling an ambulance what telephone number would you use?

☐ 911

☐ 999

☐ 118118

12. Why would you shake and shout at a collapsed person?

☐ To open the airway

☐ To restart the heart

☐ To check for response

13. What action would you use to open the person's airway?

☐ Tilt the head back and lift the chin

☐ Tilt the head and push the chin down

☐ Tilt the head down and turn the chin to the right

14. When assessing a person's breathing, what do you look at?

☐ Their chest

☐ Their eyes

☐ Their nose

15. When assessing a person's breathing, where and what do you listen for?

☐ Listen over the mouth/nose for breath sounds

☐ Listen over the chest for breath sounds

☐ Listen over the chest for a heartbeat

16. When giving breaths, for how long do you breathe into the person's mouth?

☐ 1 second

☐ 5 seconds

☐ 10 seconds

17. How many presses and breaths would you give per cycle of CPR?

☐ 30 presses and one breath per minute

☐ 30 presses and two breaths per minute

☐ 30 presses and three breaths per minute

18. Thinking about if you were in a public place and no-one else was there to help: how likely would you be to start CPR with someone who had collapsed?

☐	☐	☐	☐	☐
Definitely would not give CPR	Probably would not give CPR	Unsure whether I would give CPR	Probably would give CPR	Definitely would give CPR

19. Has the training programme changed how confident you are that you could perform CPR if you needed to? Are you …?

☐	☐	☐	☐	☐
A lot more confident	A little more confident	No change	A little less confident	A lot less confident

20. Do you think you will show family or friends how to do CPR in the future?

☐ Yes ☐ No ☐ Unsure ☐ Have already done so

21. (a) Is there a place you visit regularly that has heart-related life-saving equipment (e.g., a defibrillator)?

☐ Yes ☐ No ☐ Unsure

(b) If Yes, how near is it to your home?

☐ Within about 100 metres

☐ Within a half mile

☐ Within a mile

☐ Further than a mile from home

☐ Don't know

Thank you for your help.

Appendix C: Comparison of scores including and excluding initial survey non-participants

Table 19 below shows the mean and median scores of the follow-up sample when students who did not participate in the initial survey are included and excluded. The mean score of the sample increases slightly, from 5.95 to 6.02, when that group is included, while the median at 6.00 is unchanged.

Table 19: Comparison of mean and median student scores when the non-participants in the initial survey are included and excluded

	Mean	Median
Including initial survey non-participants	6.02	6.00
Excluding initial survey non-participants	5.95	6.00