Improving the continuity of patient care through teaching and researching novel patient handover processes in Europe

WP5-Deliverable [Public Part]:
Implementation of the Handover Modules - Feasibility Analysis
Improving the continuity of patient care through teaching and researching novel patient handover processes in Europe

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Executive Summary

During work package 5 of the PATIENT project, we adapted modules from the PATIENT Handover Training Curriculum (1) to the individual requirements and needs of the respective implementation site, Aachen (D), Cork (IE) and Barcelona (ES) and rolled out three different training pilots. The process of adaption, implementation and evaluation of these trainings is presented this report.

Although final data analyses and more valid results are still pending, we can state that the implementation phase went according to plan and preliminary results are very positive.

Based on these results and our experiences, the handover trainings will be continued. We will proceed the data collection and analyses, to publish further results. And in conclusion the integration of the PATIENT Handover Training Curriculum into different medical educational programmes is intended and prepared.
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I. Introduction

Work package 5 started in June 2014 and continued throughout the next 7 months until December 2014. Main Milestones of WP5 – aligned to the project proposal – were defined as the organisation of training pilots at the project sites including scheduling, training of instructors, preparation of simulation-based learning scenarios and adjustment of needed technology and execution of the pilots. To accomplish those milestones partners began to design specific pilots for handover training that best fit to their institution at the end of WP4. The handover curriculum as designed and published with the end of WP4 has been the fundament for the three local pilots. The handover curriculum is available open source including an instruction guide on how to apply it (1). As well as the PATIENT consortium every other institution or individual can use and benefit from the curriculum and adapt it to local needs regarding target groups, cultural aspects, existing experience and elements of the curriculum.

The WP5 progress report records the process of pilot construction, implementation and evaluation of each partner and provides inside view into partners work of enabling students to perform accurate handover.

Please note that the public version of the report cannot include details on methods and results of research questions as original publications will come out of the research, it is necessary to hold back details until publications are completed. Of course we will include transparent details in the internal report for EU notice. If you have further questions regarding the pilot studies please send those over the PATIENT website. We are looking forward to share more information with trustful partners informally.
II. Project Approach

The challenges to the development of a European interdisciplinary handover training module, as envisaged in the PATIENT project, include curricular integration across institutes, modules and programs.

Implementing the handover module in Germany, Ireland and Spain assures compatibility across the different medical undergraduate degree programmes. For the pilot implementation we are testing the handover module with smaller pilot groups at each implementation site. Until the closure of the work package, the following numbers of students have received a PATIENT handover training: Germany = 49 medical students, Ireland = 40 medical students and Spain = 13. In total we have trained 102 becoming doctors, and by this reached the estimated number (100) of the project proposal. Unfortunately, we were not able to reach nursing students during the WP5-period, as it was proposed. The training modules will be continued in 2015 to reach more students and collect more reliable data.

In the following sections the three pilots and results are described in detail.
A. University Hospital Aachen, Germany

1. Description of Local Site and Target Group

   a) Implementation Process and Course Description

Development of the UKA pilot concept

During the closing phase of WP4 the concept for the training pilot in Aachen was constructed following Kern’s principles of curriculum development (2). Outcomes of the Training Needs Analysis in WP2 have been analysed with regard to the results of the German subpopulation and influenced the finalisation of the pilot. To meet different learner styles and learning motivations the use of multiple educational methods has been considered in the curriculum, which are feasible to implement but also congruent to our learning objectives. (e.g. interactive Seminar, Online-Learning, Simulations, Case-based Training, etc.).

Implementation Process

At the University Hospital in Aachen, Germany (UKA), the pilot concept was integrated into an already existing course led by the departments for anaesthesiology, intensive care and emergency care medicine (AIE). Every student passing the fifth year of medical education in Aachen completes clinical rotations of 4 weeks of block classes in these departments. Therefore, training has been integrated into existing schedules for AIE with 3 additional units with mandatory presence, longitudinal e-learning offers and an assessment session.

Course Description

The pilot concept was provided through two modules with a focus on handover in the context of communication, error management, patient safety, interprofessional- and teamwork. The delivery of the modules is based on an interactive seminar (unit 1) and a practical handover training (unit 2) accompanied by a longitudinal online module and assessment (unit 3).

Unit 1: During the interactive seminar students received theory and background on patient safety and the connection of handover with error management, communication and teamwork. Students learned about methods, tools, checklists and mnemonics to technically structure a handover as well as ground rules for closed loop communication. Activating elements as group discussion, short videos and small group exercises were integrated into the didactical concept.
Unit 2: The practical training sessions were based on 6 clinical cases in different settings (ICU, post-anaesthesia, emergency room, internal medicine ward). Students had to perform handover of these cases in created scenarios as shift changes, patient transfer, telephone handover, etc. Students were provided with a bunch of optional checklists, tools and support to structure their handover and could choose freely how to perform it. They received feedback from peers as well as from academic staff. After the training they were handed out pocket cards to take with them containing diverse options of mnemonics and checklists.

Unit 3: The online module integrates video-based e-learning assignments and tasks as application of the CLAS App by practicing discharge letter writing. Students have to answer questions on bad- and best-practice video examples and to submit their answers. Also the discharge letter is submitted online to the course organizers and is reviewed by them. For cooperative exchange with students at European partner sites, students are asked to post their opinion and experience with CLAS App (3,4) in a discussion forum which is integrated into the online tool.

b) Student Target Group

The target group of students consists of 20-25 students per month of intervention or control group. Up to now there have been two rounds of control and intervention groups in the academic year 2014/2015 and in January and February another round of intervention and control groups will follow. This leads us to an intervention group size of 49 students in October to December 2014 plus a number of another 24 students in January 2015.

The modular curriculum in Aachen does not separate into preclinical and clinical years of education, but consists of an organ-based integrated curriculum. At this point students are in the 9th semester of their studies and have had clinical experience in clerkships and rotations before.

c) Teaching Staff

The seminar and training are delivered by experienced team members of the Aachen Consortium and always include at least one physician with clinical experience and also an academic from the field of communication science or psychology. Due to existing concepts for standardized didactical training at the Aachen Interdisciplinary Training Center for Medical Education teaching staff underwent a standardized didactical training including presentation techniques and other teaching formats.
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2. Evaluation

a) Method

The pilot concept was constructed with an integrated controlled educational research study in order to compare students without training intervention to those who had received standardised handover training during the pilot course. Paper-based questionnaires containing 25-28 items regarding knowledge and attitude towards handover and patient safety was used for pre- and post-assessment in both groups.

For practical skills assessment the students in both groups received a standardized digital case file and had to perform a handover under standardized circumstances. The handover was videotaped for checklist-based rating. The checklist for the standardised video analysis is still under final review and will be applied to the videos once the data collection is completed. Therefore we will involve experienced raters and aim for consistent rating.

b) Results

As the pilot will at least be running until the end of January 2015 (and depending on the amount of included participants perhaps until February), the final results are still up for analysis. From the 49 students that already participated in the PATIENT pilot handover training, it was possible to collect 42 pre-questionnaires, 40 post-questionnaires and 31 recorded handovers. The extensive results of this pilot study will be prepared for publication in peer reviewed journals and at medical education conferences as part of the dissemination of the PATIENT project. Preliminarily we can conclude that the students, who participated in the PATIENT handover training, evaluate themselves more confident performing verbal and written handovers as well as using standardised communication tools in the post-questionnaire. Also they rate routinely handover training as useful and important.

3. Discussion and Conclusion

As it would be too early to draw valid data-based conclusions, we will postpone this one month further. But nevertheless the implementation of the pilot has already provided experience and insides of the students’ performance, motivation and willingness to train handovers.

In sum, students were very open to the topic and motivated to participate once they realized the importance of the topic in their upcoming work life. During the interactive seminars of unit 1 we had open discussions about error-management and participants were sensitized on their own error
behaviour and management. Within the practical handover session they were very keen on understanding and using provided checklists and materials and were glad to receive our pocket cards as memory hook. During their on-ward presence in the clinic, we experienced students to be very attentive during the handovers and saw efforts to transfer what they had learned so far. During the video-based handover assessment we already observed an (subjective) increase of structure and application of checklists or mnemonics they used during our training. Valid data from structured video analysed are still pending.

We are very much looking forward to the finalised data and will provide further information in the final report and publications in (peer reviewed) journals.

In terms of feasibility of the organisational process, we were very lucky to be involved in the teaching processes in the departments of AIN already. So we did not face great challenges to actually change schedules, acquire and contact students or recruit teaching staff for the pilot. With the current version of implementation it would be possible to continue training sessions after the end of the PATIENT project. In terms of time- and cost-efficiency it would also be possible to combine and condense the different units and shift some more content into the handover toolbox.
B. University College Cork, Ireland

1. Description of Local Site and Target Group

   a) Implementation Process and Course Description

The handover project pilot was devised and constructed and assimilated into the existing curriculum for medical students at the School of Medicine at UCC. The content of the PATIENT curriculum and education materials for handover training developed during WP4 of the project formed the basis of the content material. Educational content is available for online learning to the UCC students through the Handover Toolbox and UCC Blackboard. The final year pilot took place in the pre-existing high fidelity simulation facilities in the School of Medicine at UCC namely the Essential Intern Skills syllabus in the high fidelity simulated ward of the Medical Assessment Unit and in the Emergency Medicine syllabus in the ASSERT Centre (Application of Science to Simulation, Education and Research on Training for Health Professionals)

The pilot for final year students is an evaluation of the handover simulations and of the online training educational material through the Handover Toolbox and Blackboard at UCC.

The students are informed in advance of the simulation with respect to the purpose of the simulation, the location of the simulation, the date and the time of the simulations. The students are asked to prepare in advance for the Handover simulation by familiarising themselves with the recommended background reading in Handover and the Learning Outcomes for the Handover Simulation within the Handover Toolbox and Blackboard including the CLAS App. They are informed that they will play the role of newly qualified doctors in the simulation. A qualified nurse who plays the role of the ward sister in the simulated ward supports the students.

On the morning of simulation training for handover students are met by a member of faculty and briefed on the learning outcomes, objectives and structure of the teaching and learning session. They are informed that the assessment of their performance is formative and that they will receive at the end of the simulation session generic feedback in relation to the scenarios from faculty as a group, and that they will receive a confidential written copy of a metric based assessment of their performance in the scenarios. In UCC the simulated ward is fitted with audio-visual equipment. This remotely streams video and audio to the desktop computers of faculty observing and assessing the student’s performance in the simulation. Students are informed of this before they commence simulation training.
Three scenarios covering handover occur in the Essential Intern Skills Simulation. In the first scenario the student in the simulated role of a newly qualified doctor is to handover a patient to a faculty member in the simulated role of a senior doctor in a face-to-face situation. In the second scenario the student in the role of a newly qualified doctor is to handover a patient to a faculty member in the simulated role of a senior doctor via a telephone. In the third scenario the student in the simulated role of a newly qualified doctor is to write a discharge letter to the patient’s general practitioner. One Scenario will be covered in the Emergency Medicine Simulation, in this scenario the student in the role of a newly qualified doctor is to handover a patient to a faculty member in the simulated role of a senior doctor via a telephone.

The pilot for third year students takes place in the Brookfield Health Sciences Complex of UCC and will include a simulation bases scenario in which students will prepare a discharge from hospital for a simulated patient. They then perform a handover via a telephone to a member of faculty who will be simulating a doctor in general practice in the community setting. This pilot is undertaken by the UCC consortium members and with substantial support from experienced medical colleagues from the fields of Communication Skills and General Practice at UCC. The pilot for third year medical students is designed to an evaluation.

b) Student Target Group

The target student group for the pilot study at UCC consists of 3rd and final (5th) year medical students. The pilot for final years was conducted in module “Research and Professionalism in Medicine” and in third year in “Mitigating Medical Error”. The final year Pilot commenced in October 2014 and the third year pilot in November 2014. The pilot was completed in semester 1 of the 2014/2015 academic year.

c) Teaching Staff

The pilot study at UCC is led by the 3 UCC PATIENT consortium members along with substantial support from other faculty members at the School of Medicine.

2. Evaluation

a) Method

Students were asked to evaluate the handover training using a questionnaire.
b) Results
Evaluation was completed in January 2015. 41 final year students participated in the pilot project. The third year pilot is ongoing and results will not be analysed until the end of the academic year 2014 / 2015.

In general students responded very positively to the training in handover. They indicated that the main advantages of the handover training were the opportunity to perform handover in simulation and to view the handover training videos on blackboard. They indicated that they were unlikely to use the other text based learning material on blackboard or in the Toolbox. In particular they indicated that they regard the training as very useful. When asked to give their opinions on statements using a Likert scale in relation to the value, relevance, appropriateness of content and pace of learning, development of clinical skills for handover, recommending of the simulation to peers and having further simulations, the students’ strongly agreed with these statements. They were undecided or disagreed with a statement in relation to the value of the text based online material.

It is the intention that the results of both pilots will be prepared for publication in peer reviewed journals and at medical education conferences as part of the dissemination of the PATIENT project.

3. Discussion and Conclusion
The handover training has been generally well received by the final year medical students at UCC, in particular the simulation aspect of the training. Students were eager to engage with training videos but less likely to do so with text based materials. This may be due to the fact that medical curricula are generally perceived by students to be overloaded and that as adult learners they engage with material that has an immediate relevance to preparing them to undertake functions that are relevant to their current training and work needs.

In terms of feasibility of the organisational process it was straightforward to introduce the handover simulation and training content into the curriculum of final years and third year medical students at UCC. Students and faculty have positively received it. Handover training will be introduced into the UCC curriculum as a result of this pilot study.
C. Fundacion Avedis Donabedian, Barcelona, Spain

1. Description of Local Site and Target Group

   a) Implementation Process and Course Description

   The methodology for this module is based on a combination of theoretical and practical sessions (based on simulation exercises and role playing). The station’s material, readings and additional resources are also provided through the Handover Toolbox.

   The module has been structured in 4 stations. The module for the 5th year students was carried out face-to-face using simultaneously the Handover toolbox as an instrument to conduct activities, the participation in forums and network learning. Each student had a computer throughout all the sessions. For this edition the seminar was developed in 8 hours (2 hours per station).

   The module for the 6th year students is completely virtual. The students go through the 4 planned stations asynchronously and autonomously. The participation on this activity was optional.

   b) Module content

   The first station, with a more theoretical approach, includes basic concepts of patient safety, team communication and relevant concepts related to handover.

   Students were informed about the general aspect of the seminar, the learning objectives and the main contents that would be addressed. A qualitative verbal and written evaluation was conducted at this stage with the aim of identifying the students’ pre-intervention competences and attitudes.

   General questions about medical errors, communication problems were discussed by groups and using the Handover toolbox.

   Throughout the second station, systematic communication tools will be applied in different handover scenarios. Several types of verbal communication (telephone communication with other professionals, shift handover, communication with other levels of care) are analysed and performed by simulation and role-playing. Evaluations are conducted during this process using a checklist to verify the implementation of key aspects for each case.

   The third station, focused on the written handover, included practical exercises of qualitative evaluation of discharge letters of medical and surgical patients, obtained accessing the real electronic medical histories (in order to guarantee confidentiality, the students did not have access to the patients
identification data). Students used the Handover toolbox to share their opinions on the quality of the reports.

In this same station, students had the chance to prepare a discharge report (based on a vignette designed for this purpose). Using the Handover toolbox the students send their discharge reports, read those from the other students and, then, qualitative and quantitatively self-evaluated the quality of their reports using the CLAS ML app (4).

Finally, the fourth station, focused on the global revision of medical errors and adverse events from a systemic perspective. A video was screened presenting a case of a severe adverse event. Throughout the case several problems and mistakes related with the communication a different types of handover could be detected. The students identified and discussed the presence of latent conditions.

c) **Student Target Group**

Two modalities have been planned for the pilot study.

The first modality was designed to be included into the existing curriculum for 5th year medicine students, specifically for the course of Health Management and Public Health. The completion of the activity is a requirement to pass the course and it has been structured as a seminar format for 15 students.

The module for the 6th year students is completely virtual. The students go through the 4 planned stations asynchronously and autonomously. The participation on this activity was optional. 80 students were invited to use the Handover Toolbox. As this is an optional activity, the number of students who participate is still uncertain. An assessment test of knowledge and attitudes at the end of the training process will be used.

d) **Teaching Staff**

The pilot study of the project was developed in the Faculty of Medicine of the Autonomous University of Barcelona, with the participation of the Avedis Donabedian Research Institute team, the support of the Faculty members at the School of Medicine and collaboration from a hospital physician for practical sessions.
2. Evaluation

a) Method

The main evaluation method for this pilot was qualitative, which was carried out through two sources. On the one hand, the content of the Handover toolbox (students’ collected experiences, opinions, statements and attitudes) was analysed.

On the other hand, upon the completion of the training module a focus group was carried out in order to capture the students’ impressions, vision and improvement proposal on the pilot.

The students were requested to give their informed consent and they were informed on the objectives and procedure of the focus group. The session was recorded and the impressions on the training module were collected.

After the implementation of the module a quantitative post-evaluation was also carried out. Two electronic surveys were designed, one on knowledge and others on the personal and individual experience.

The knowledge evaluation consisted on 8 question that included general issues on adverse events and preventability, latent conditions, error prevalence, reduction strategies, description of structured communication tools, key aspects of a discharge report and duty shift handover and communication techniques (i.e., “check-back”).

The evaluation on personal and individual experience was carried out with a survey that included aspects such as the perceived impact of the knowledge, perceived utility, evaluation of the presented scenarios, utility of CLAS app and utility of the Handover toolbox.

b) Results

In the face-to-face module 13 (of the 15 planned) participated actively. The 2 students that did not participate were absent for reasons out of the control of the module coordination. Students actively participated and engaged. At this stage the contents of the transcription of the focus group are being transcribed, therefore the final results are not yet available. As a summary, the acceptance was very good. The students expressed unanimously that it was the first time in their academic experience that they had the chance to learn about those issues. None of them had had a previous experience neither preparing a discharge report, nor simulating patient handover, nor using structured communication
techniques. As to the section of comments, it is worth highlighting some of the students’ appreciation of the module.

“Those practical seminars have been very useful, as I have realised that the communication between professionals and patients is very important and doing it correctly is harder that one might think.”

“I think that seminar is very good and it should be a requirement for all students, even if this meant reducing material from the core subject. This is very relevant information and it is not covered in other subjects, which contrast with topics such as obesity, tobacco and others that are covered in every subject. Congratulations on the work done.

“In order to evaluate the items on the reports, one has to lose a lot of time downloading the mobile app. Very often there is no Wi-Fi available and it would be more practical in one could have a computer program in the computer and have access from the platform. Personally I haven’t been able to download it. The rest has been quite good, as in other subjects there is neither space to practice how to prepare discharge letters nor handover of information. We see it in the internships, but we don’t do it ourselves as students.”

Definite results of the pilot will be prepared for publication in peer reviewed journals and at medical education conferences as part of the dissemination of the PATIENT project.

3. Discussion and Conclusion
The experience of implementing the training module has been generally evaluated as positive by the 5th year students participating in the face-to-face seminar.

Although initially 15 6th year students had shown interest, unfortunately, at the moment of the evaluation only one student had registered in the online voluntary module. Many of the other students have contacted the coordinating team by email and excused themselves due to the excessive workload they have in exam periods. We will wait for a month to reach conclusions. A priori, even if the topic is interesting to students, in order to get their real participation in this kind of training activities those need to be included in the training curriculum.
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In contrast, the results for the face-to-face seminar were very positive. A 100% of the registered students participated in the 4 stations and they showed interest, were motivated and engaged throughout all the sessions.

The initial quantitative results show a great agreement by the students in the achievement of most of the learning goals, especially those related to attitudes, specific knowledge on the implementation of standardized tools and the understanding of the systemic approach to the organisation of care processes and the production of errors.

There are some elements, such as the security acquired in the preparation of the discharge letter, the knowledge on the role of other professionals and the own communication styles that could be reinforced.

With the systematic analysis of the contents of the qualitative evaluation still pending, some of the possible improvement areas as manifested by the students are related with the need of extra time and intensity of the training module, the opportunity to carry out more simulations and preparation of clinical histories and inter-consultations.

The experience of combining face-to-face sessions with the Handover toolbox has been excellent, proving to be a useful complementary tool for the face-to-face activities and the network learning.

Still waiting for the definitive results, it is can be considered a feasible module to implement as integrative part of training programmes, without requiring great expenses or additional resources.
III. Customisation of the Handover Toolbox

During the work in WP4 and WP5 we observed specific requirements and needs with respect to the Handover Toolbox. We tested the Toolbox with the medical instructors of the new training module and it appeared that the original version was rather out-dated and not very user friendly for them. We therefore needed to update various parts of the Toolbox towards more modern web technologies to make it faster, easier to use and more responsive. This has been accomplished in close collaboration with the medical stakeholders. As a result core parts of the Toolbox have been redesigned and reengineered to make the usage more convenient. Furthermore, we integrated the Toolbox into the PATIENT website as this becomes increasingly the central information architecture for the whole PATIENT project. After this reengineering phase the consortium configured and adjusted the Toolbox to the needs of the local pilot studies. The partners could use the toolbox as a shared platform that contains small and simple group environments for their local pilot studies. The technical partners supported the medical partners in setting up their environments and preparing their pilot studies. The latest version has been approved by the medical partners and taken into the pilot tests. Figure 1 and Figure 2 show the previous and new design of the Handover toolbox.

![Figure 1: The original design of the Handover Toolbox as developed in 2011 in the FP7](image1)

![Figure 2: The new design of the Handover. It got extended with latest web technologies to improve the user experiences.](image2)
IV. Conclusion

Despite of definite data results still pending, feedback and evaluation of the students are positive throughout the locations. Since a lack of knowledge in patient handover and safety has been identified students are eager to have a standardised curriculum based teaching integrated into their undergraduate studies and clinical block rotations.

Developing the pilot according to Kern’s six step approach of curriculum development for medical education (2) ensured a professional conduct of the concept. Goals of developing a pilot concept adapted to local needs and standards have been met. We were able to show that the integration of the curriculum into different medical education programmes is not only feasible but also well accepted and even appreciated.

V. Future Prospects

In 2015 the partners from UKA will continue the handover pilot training module in order to reach more students and to collect more data to confirm feasibility and efficiency. We will try to continue training modules after the end of the PATIENT project depending on available staff resources for clinical teaching in handover and patient safety.

Alongside UKA took the chance to train paramedic candidates as well as paramedic workforce in Aachen, approximately around 150 until the end of 2014. Those received 3 units of training intervention with essentials and background on patient safety and handover with the specific context of preclinical patient care as well as a practical handover training session. A pre- and post-survey was conducted to compare paramedics’ attitudes regarding patient safety and handover issues. Results are still up to be analysed. These trainings will be continued in 2015 as well.

At UCC and FAD the training pilots will also be continued in 2015.

As part of the dissemination plan, all partners will continue to publish results in journals and to present at medical education conferences.
References


