



Research article

The clinical task force: Improving quality of medical students' internship

J.J. Baker^{a,*}, N. Weis^{a,b}, T. Boysen^{a,c}, M.H. Bestle^{a,d}, A.G. Andersen^a,
A.M. Morcke^e, L. Bremholm^{a,f}

^a Dept of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark

^b Department of Infectious Diseases, Copenhagen University Hospital, Hvidovre, Denmark

^c Gastroint, Division of Medicine, Copenhagen University Hospital, Hvidovre, Denmark

^d Department of Anaesthesiology and Intensive Care, Copenhagen University Hospital, North Zealand, Copenhagen, Denmark

^e Centre for Educational Development, Aarhus University, Aarhus, Denmark

^f Department of Surgery, Zealand University Hospital, University of Copenhagen, Koege, Copenhagen Denmark



ARTICLE INFO

Keywords:

Evaluation
Internship
Learning points
Medical students
Quality improvement

ABSTRACT

Background: Up to 40% of young medical doctors feel that the internships prepared them insufficiently for the clinical work. This study investigated whether a Clinical Task Force (CTF) could improve internship quality.

Methods: The CTF visited internship departments with a triple-targeted approach: first, departments pre-filled a self-evaluating questionnaire; secondly, CTF visited departments to discuss the self-evaluation and previous student evaluations; and thirdly, CTF and departments agreed on several quality-improving focus points to work on after the meeting. Focus points were followed-up after three and 12 months. The impact on internship quality was assessed with departments' student evaluation scores, number of completed focus points, and the effect of completed focus points on a range of learning parameters. The CTF learned several things along the way, that potentially could affect the quality of internships. A shortlist of these was provided to illustrate unmeasurable benefits.

Results: The CTF met with 53 out of 60 eligible departments. The CTF and departments agreed upon 197 focus points of which 64% were completed. The three most frequent categories of focus points were Introduction of the students, The departments' evaluation percentage, and The departments' function as an educational site. The mean student evaluation scores did not change significantly, but the individual evaluation parameters changed significantly in two categories. It decreased in the category regarding the students' satisfaction with the clinical lecturers and the scheduled teaching and increased in the category regarding the percentage of students evaluating the department.

Conclusion: The CTF's triple-targeted approach did not increase the mean student evaluation score significantly. For departments that completed the agreed focus points, one category increased and another decreased. However, the unmeasurable benefits illustrated that CTF was a good viable linking element between the faculty, departments, and students with the potential of improving other aspects of the quality of internships.

* Corresponding author.

E-mail address: jason_baker9@hotmail.com (J.J. Baker).

1. Introduction

Internships during medical school prepare students for their upcoming years of clinical work. However, up to 40% of young doctors feel that the internships prepare them insufficiently for the clinical work-life [1, 2, 3]. Unprepared newly educated doctors have a higher rate of medication errors which potentially increases mortality [4] by up to 10% [5]. Moreover, doctors that feel unprepared for clinical work, have an increased risk of burnout [6] underlining the importance of sufficient training and preparing new doctors.

Medical students' internships play an important role in preparing the students for their future work as medical doctors [7]. During internships, medical students, clinical teachers, and faculty do not always have the same ideas and expectations of what is important, nor of the struggles, problems, and solutions [8], indicating the need for a stronger connection between them. Some argued that clinical teachers cannot solely rely on their experience for what the students require, but they must keep developing their expertise on students' struggles and how to address them [8]. It is therefore important to pay attention to how internships can keep optimizing learning [9]. One essential tool for course development and student learning is the students' evaluation of internships [10]. Moreover, a combination of departments' self-evaluation and student evaluation could potentially stimulate an even greater improvement because it increases the visibility of strengths and challenges from a dual perspective [11]. Inspired by all the above, the idea of a Clinical Task Force (CTF) emerged. The purpose of the CTF was to visit hospital departments with students in internships to evolve and improve the internships' quality.

This study aimed to investigate the CTF's impact on internship quality by measuring the departments' evaluation scores, their completed number of focus points, and the effect of completing the focus points.

2. Methods

This prospective, quality improvement cohort study is reported according to the revised Standards for Quality Improvement Reporting Excellence guideline (SQUIRE 2) [12].

2.1. Context

The Department of Clinical Medicine, organized under the Faculty of Health and Medical Sciences at the University of Copenhagen in Denmark, established the CTF in 2016. The Department of Clinical Medicine undertakes pre-graduate training of medical students in the eastern part of Denmark and employs Associate Professors, Clinical Associate Professors, and Professors. They participate in regular in-hospital meetings regarding the education of medical students. Each department has a Clinical Associate Professor or Professor, who is the medical students' internship coordinator.

The students' longest internships are at the two semesters of the fourth year of medical school and are within surgery and internal medicine. These internships are similar in length and composition, and can therefore be compared. The three internships that the study comprises take place in the medical students' first and second semesters of the fourth year of the medical degree. The first internship could be in either a medical or a surgical department. The second and third internships take place in a medical and a surgical department, respectively. Each internship lasts five weeks. The clinical departments have three five-week periods with students in internships per semester.

Routinely, students evaluate the internships voluntarily and electronically. Completing the questionnaire is not mandatory for the students. The student evaluation questionnaire is distributed and conducted by the University of Copenhagen, which makes the results available each semester. The CTF was not involved in creating the questionnaire or the distribution. The departments are evaluated on a 1-5-point Likert scale on the following eight parameters: a) *The introduction met my expectations*, b) *I was given specific assignments*, c) *I did clinical work under supervision*, d) *I got adequate help from the non-medical staff to the clinical work*, e) *I received useful feedback on my clinical work*, f) *I am satisfied with the clinical lectures (see Supplementary Table 1) under my internship and the scheduled teaching*, g) *The internship made it possible for me to complete the course's statement of aims and logbook*, h) *The department/internship is overall well-functioning as an educational site for medical students*. The results from the evaluation include data for each parameter and a mean score of the eight parameters.

During the study, the CTF consisted of six Clinical Associate Professors with several years of experience with medical students in internships and several student representatives. The Clinical Associate Professors were specialized in cardiothoracic surgery, obstetrics, and gynecology, infectious diseases, anaesthesiology, and gastroenterology and hepatology. The CTF also consisted of student representatives that took part in the meetings. The student representatives are members of the student council at the Department of Medicine. At the meetings with the hospital departments, the CTF was represented by preferably, but not exclusively, two Clinical Associate Professors and one student representative. The Clinical Associate Professors prepared the presentation, directed the meeting, and wrote summaries, the student representative provided questions and ideas from the students' perspective during the meetings. An administrative employer handled practical issues such as booking meetings, communication, and retrieving files and data.

2.2. Intervention

From 2017-2019 the CTF met with surgical and medical departments at all teaching hospitals within the Capital Region and Region Sjælland in Eastern Denmark. Through the coordinating Clinical Associate Professor, Clinical Professor or Professor, all faculty members (Professors and Associate Professors), heads of departments, and if relevant; secretaries dedicated to students' internships

and young fellows appointed as tutors related to the medical students, were invited to the meeting situated in their own department. There were 60 departments, 34 medical and 26 surgical, eligible for a meeting.

All eligible departments were invited by an introduction letter which included notification of a future meeting, expectation of attendance, and information about the CTF. When a date was scheduled, the department received a second letter to confirm the date and further information about the meeting. Within the second letter, the departments were asked to share all written material provided to the students and to complete a self-evaluating sheet (Additional file 1) before the meeting. All correspondence went through email.

The meetings were set in a dialogue-based form. Challenges, potentials, strengths, and good experiences learned from other departments were discussed. The meetings were standardized, but with individual adaptations depending on the answers from the departments' self-evaluation sheet, documents they provided to the students, and their evaluation. A standardized presentation (see example in Additional file 2), with individual alterations based on the student evaluations and the department's self-evaluation sheet, was used as a structural frame for the meeting. The duration of the meetings was 2.5–3 h. In collaboration with the departments, 2–6 focus points were agreed upon at the end of the meeting, to have specific targets for improving the internships. The focus points were created at the meeting in a dialogue between departments and CTF combined with departments' answers in the self-evaluating questionnaire, the material they send to the students, student evaluation, and subjects discussed during the meeting. The type and number of focus points reflected the departments' challenges, resources, and motivation. The focus points were mainly targeted to match areas of, but not exclusively, the students' eight evaluation parameters. In the meetings, it was also emphasized to improve the number of students evaluating the internships, and methods of improvement were presented. After the meeting, the department received a comprehensive meeting summary, inspirational material (if relevant), the presentation used at the meeting, and a link to an electronic short five-item questionnaire about their satisfaction with the meeting (collected with Google Forms survey) (Additional file 3).

2.3. Study of the intervention

The focus points were followed up three and 12 months after the meeting (See follow-up questionnaires in Additional file 4 and Additional file 5). Follow-up was conducted by e-mail correspondence with the departments' coordinating Clinical Associate Professor, Clinical Professor, or Professor. To ensure that the departments had a realistic chance to complete the assignments at the first follow-up, they were given two extra months if the first three months overlapped with the two months of summer holiday. The evaluation scores were provided by the University of Copenhagen after each semester. We included evaluation scores from the semester before the meeting, one semester after the meeting, and two semesters after. Thus, excluding evaluation scores from the semester where meetings were held. The focus points were categorized and paired with the individual evaluation parameters to see if they improved if the focus points were completed.

Throughout the literature on the medical educational field, there is an increased focus on the importance of describing what else was learned during implementations in the medical educational field [13, 14]. The CTF did also learn several things along the way, that potentially could affect the quality of internships. Therefore, a short description of quality-assessed learning points was provided as a secondary outcome to illustrate the unmeasurable benefits of the CTF.

2.4. Measures

The departments' focus points were categorized within the eight parameters if possible. Focus points were categorized within "Evaluation" if they were regarding the form or systematization of evaluation, or methods of increasing the evaluation percentages. If the focus points could not be within the eight parameters or concerning evaluation, they were categorized as "other". The first and last authors conducted the categorization of focus points.

The follow-up on the focus points also allowed the departments to elaborate, explain, and comment on the progress of the implementation. The elements of what else was learned during implementations in the medical educational field were collected from the responses of the focus points, the meetings, and email correspondence.

2.5. Analyses

The statistical analyses were conducted with IBM® SPSS® Statistics version 26.0 (Armonk, NY: IBM Corp.). Evaluation scores were tested for normal distribution with the Shapiro-Wilk test. The mean evaluation data one semester before the meeting was compared with one and two semesters after the meeting. The samples of non-parametric continuous evaluation data were compared with the Wilcoxon signed-rank test. The samples of normally distributed data were compared with the paired student's t-test. Categorical binary data were compared by the Chi-squared test or Fisher's exact test. For all tests, a p-value of ≤ 0.05 was considered significant. For some of the departments, the last follow-up of the agreed focus points and evaluation was at the beginning of the SARS-CoV-2 pandemic. Sensitivity analyses were therefore conducted to assess whether it affected the results.

2.6. Ethics approval

Ethics approval is not required for this type of study according to Danish law.

3. Results

Meetings were established with 53 (83%) of the 60 eligible departments (see Additional file 6) but three of the departments requested a joint meeting with another department. In addition, one extra meeting with two departments in psychiatry was performed (due to acute need for help related to the quality of their internship), giving 51 meetings and 55 departments in total (Figure 1). The meetings took place 2017–2019.

One semester after the CTF meeting, 19 departments improved their student evaluation score, 17 had a lower evaluation score, eight did not change, and nine departments had zero students' evaluating them neither before nor after the meeting. Two semesters after the CTF meeting, 14 departments had increased their evaluation score, 25 had a lower score, five did not change, and nine departments had zero students' evaluating them neither before nor after the meeting. The evaluation scores are shown in Table 1, and even though they all numerically increased, none of the changes were significant.

Out of the 197 focus points (Table 2), the three most frequent categories were the *Introduction of the students*, *The departments' evaluation*, and *The departments' function as an educational site*. Even though most of the departments responded to the follow-up, some did not complete the focus points within the 3- or 12-month follow-up. Five departments did not respond to the three-month follow-up, and seven did not respond to the 12-month follow-up (Figure 1).

The impact of completed focus points on the specific evaluation parameters is shown in Table 3 for departments with data before and after the meeting. The median evaluation scores significantly increased, for evaluation parameter "f" after two semesters, and the

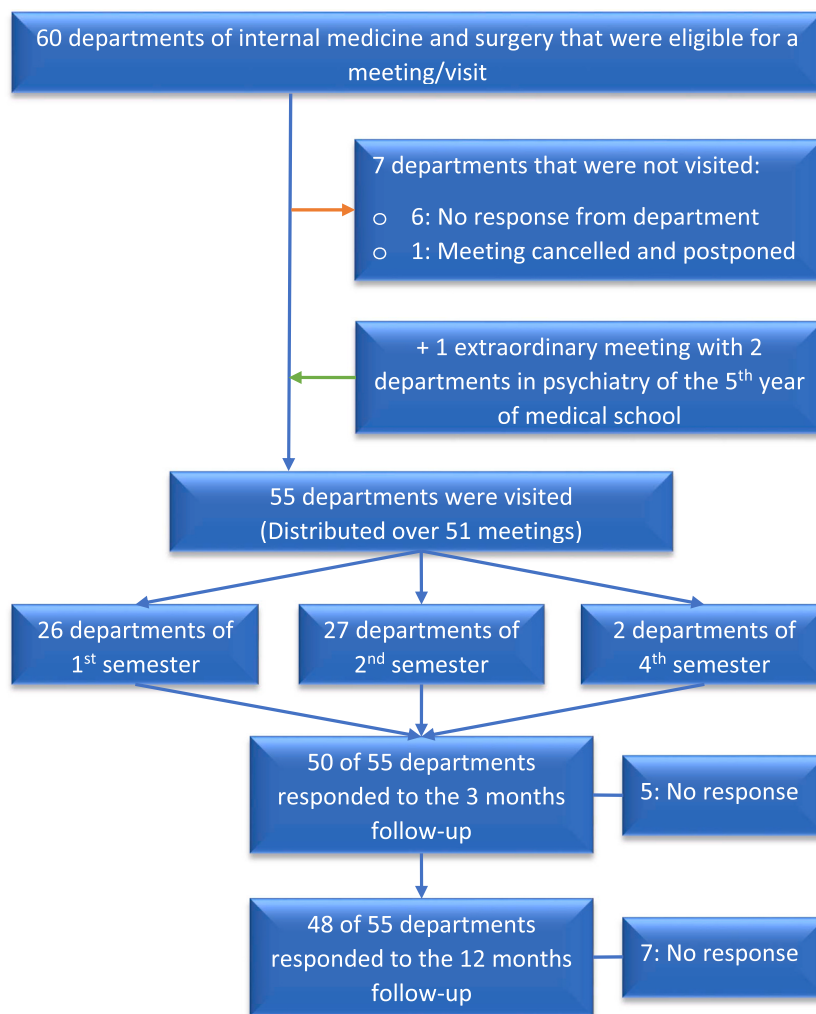


Figure 1. Flowchart of all departments with medical students of 1st and 2nd semesters of the fourth year of medical school in internships of internal medicine and surgery. There was also one extraordinary meeting with two departments of psychiatry that had medical students in the 5th year of medical school. Three meetings were with two departments at the same time because they shared management and Clinical Associate Professors. The focus points which were agreed upon at the meeting were followed-up after 3 and 12 months. Responding to the follow-up did not necessarily mean that the departments had completed the focus points.

Table 1

The departments' evaluation scores before the meeting, one semester after, and two semesters after the meeting. Data is presented for departments with 1st semester students, 2nd semesters students, and for all departments. Data were analyzed for significant differences with the Wilcoxon signed-rank test.

	Evaluation scores	
	Median (IQR)	p-value
<i>Departments with 1st semester students</i>		
1 semester before meeting	4.3 (4.1–4.6)	(ref)
1 semester after meeting	4.3 (4.1–4.6)	0.717
2 semesters after meeting	4.4 (3.8–4.5)	0.305
<i>Departments with 2nd semester students</i>		
1 semester before meeting	3.9 (3.6–4.5)	(ref)
1 semester after meeting	4.2 (3.8–4.5)	0.609
2 semesters after meeting	4.1 (3.6–4.4)	0.572
<i>All departments</i>		
1 semester before meeting	4.2 (3.8–4.5)	(ref)
1 semester after meeting	4.3 (3.3–4.6)	0.815
2 semesters after meeting	4.2 (3.7–4.5)	0.294

IQR: Interquartile range; n: number of departments; ref: reference score.

Table 2

Overview of the number of focus points and completion of these. Focus points were categorized within the evaluation parameters a-h or "Evaluation" or "Other". The number of focus points was 2–6 per department and there could be more than one focus point within a category. The number of completed focus points within 3 and 12 months are shown in the last two columns. The difference in the number of completed focus points between 3 and 12 months is compared with the chi-squared test or Fisher's exact test.

Categories of focus points	Number of focus points	Focus points completed after 3 months, n (%)	Focus points completed after 12 months, n (%)	p-value
a	63	28 (44)	35 (56)	0.212
b	19	8 (42)	10 (53)	0.516
c	13	9 (69)	11 (85)	0.352
d	1	0	0	-
e	7	4 (57)	7 (100)	0.192
f	19	4 (21)	7 (37)	0.283
g	3	2 (67)	2 (67)	1.000
h	33	15 (45)	22 (67)	0.083
Evaluation	33	24 (73)	29 (88)	0.122
Other	6	2 (33)	3 (50)	0.558
Total	197	96 (49)	126 (64)	0.002

The focus points were categorized into the following:

a: "The introduction met my expectations".

b: "I was given specific assignments".

c: "I did clinical work under supervision".

d: "I consider the help I got from the non-medical staff to the clinical work was adequate".

e: "I consider that I received useful feedback on my clinical work".

f: "I am satisfied with the clinical lectures under my internship and the scheduled teaching".

g: "The internship made it possible for me to complete the course's statement of aims and logbook".

h: "The department/internship is overall well-functioning as an educational site for medical students".

Evaluation: Focus point in regards to improving the evaluation of the internships.

Other: None of the above.

category regarding evaluation after one semester. Examples of the focus points are illustrated in [Supplementary Table 2](#).

The result of the departments' satisfaction with the CTF meetings is presented in [Supplementary Table 3](#). Of the five different scores, 82–97% of the answers were either "Very satisfied" or "Satisfied".

A short summary of other learning experiences is illustrated in [Table 4](#).

4. Discussion

The Clinical Task Force was established to improve the quality of clinical training, and the participating departments actually completed 64% of the planned focus points. Disappointingly, the study also found that the medical students' evaluation scores of their clinical stay at departments of medicine and surgery did not change significantly after the meetings. However, through the examples illustrated in [Table 4](#), the CTF proved to be a linking element between faculty, departments, and students.

Medical students undergo several internships in different departments and hospitals during their education, and they must adapt to different clinical settings and working environments every time. A study has previously found that continuity in internships improves

Table 3

The effect of completing a focus point was measured by changes within the evaluation parameter it was categorized. The score of the evaluation parameter before the meeting was compared with the score one and two semesters after. Including the effect of completing focus points within the evaluation. There were 2–6 focus points per department and there could be more than one focus point within a category. Medians and interquartile ranges are shown for evaluation scores. Mean and standard deviation are shown for the evaluation percentage. “n1”: number of departments with evaluation data that completed the focus point after one semester; “n2”: number of departments with evaluation data that completed the focus point after two semesters; “-”: two or fewer cases; “no data”: Evaluation data missing because no students evaluated the department in one of the semesters.

Categories	n ¹	No data	1 semester before	1 semester after	p-value	n ²	No data	1 semester before	2 semesters after	p-value
a	23	6	4.1 (3.4–5.0)	4.5 (3.9–5.0)	0.170	27	7	3.9 (3.3–5.0)	4.4 (3.6–4.8)	0.355
b	8	2	4.2 (3.5–4.9)	4.3 (3.4–4.9)	0.750	10	2	3.8 (3.2–4.2)	4.3 (3.9–4.9)	0.309
c	9	2	4.6 (4.4–4.7)	4.5 (4.3–4.8)	1.000	11	3	4.6 (3.9–4.7)	4.1 (3.5–5.0)	0.674
d	-	-	-	-	-	-	-	-	-	-
e	6	1	4.3 (3.1–4.7)	3.8 (3.7–4.1)	0.786	9	2	4.3 (3.0–4.6)	4.3 (4.0–4.6)	0.866
f	4	1	4.0 (3.7–5.0)	4.4 (3.5–4.8)	1.000	6	0	4.0 (3.8–4.8)	3.7 (3.1–4.0)	0.042
g	-	-	-	-	-	-	-	-	-	-
h	17	4	4.5 (3.6–4.9)	4.5 (4.1–4.7)	0.937	22	6	4.4 (3.7–4.9)	4.1 (3.6–4.6)	0.459
Evaluation	24	6	35.2 (21.1)	55.3 (24.7)	0.011	29	7	36.6 (19.8)	37.7 (25.7)	0.857

The focus points were categorized into the following:

- a: “The introduction met my expectations”.
 - b: “I was given specific assignments”.
 - c: “I did clinical work under supervision”.
 - d: “I got adequate help from the non-medical staff to the clinical work”.
 - e: “I received useful feedback on my clinical work”.
 - f: “I am satisfied with the clinical lectures under my internship and the scheduled teaching”.
 - g: “The internship made it possible for me to complete the course’s statement of aims and logbook”.
 - h: “The department/internship is overall well-functioning as an educational site for medical students”.
- Evaluation: Focus point in regards to improving the evaluation of the internships.

Table 4

Short summary of quality-assessed learning points during the 51 meetings.

- o The setup is also implementable for other types of internships – for example, two psychiatric departments sought help and inspiration from the Clinical Task Force and the same setup was successfully used.
- o The number of students in the departments wasn’t always adequate.
- o Many departments didn’t use the University’s intranet for distributing information and material, because it didn’t function well.
- o Some departments didn’t know where and how the students evaluated.
- o In the follow-up of focus points, a few departments did not find the focus points relevant anymore.
- o A protocol of the structure of the internships was warranted from several departments.
- o A new EPR IT-platform was introduced in East Denmark: Due to this, meetings were postponed, and several departments claimed to be too busy to implement the focus points.
- o During to the SARS-CoV-2 pandemic, the departments evaluation scores and percentages decreased, indicating that it, highly affected the students’ internship negatively.

the learning environment [15], but continuity can be difficult to withhold between the various medical specialties, departments, and hospitals. Of the 197 focus points found in this study, several were similar and were working towards a structural standardization, thereby increasing continuity when the students proceed to a new department. We did not measure this possible effect.

Most of the focus points were good ideas and experiences brought forward, and it would make sense that these should improve the departments’ evaluation. Surprisingly, we did not find such a direct correlation. The focus points (Supplementary Table 2) were simple and possible to implement within two semesters. Furthermore, they were within aspects others had found to be prominent for improving internships, such as the introduction, supervision, feedback, and structural improvements [16, 17, 18, 19, 20]. For 13 departments, the follow-up after two semesters was within the SARS-CoV-2 pandemic, which has had negative consequences on other internships [21, 22], but it is uncertain how this has affected the evaluation scores.

The CTF became a linking element between the faculty, departments, and students. This linking has several potentials: 1) it makes it possible to locate systematic challenges or areas that can be improved and 2) it is important in order to ensure that the doctors in charge of the internship have sufficient resources and knowledge to fulfill their responsibilities [23, 24]. Expectations as to what clinical skills the students should be learning at internships might not always be the same [25], but with inputs from the departments of what students are actually taught, these potential issues can be addressed as well.

This study has limitations. Since interventions in internships are subjected to changing environments and are affected by many components, which are often very complex, the results should be considered with caution [13, 14]. Non-significance of the increased evaluation scores could be due to clinical site complexities occurring simultaneously, such as the implementation of a new IT-platform (see Table 4), change of staff, departments’ workload, etc. Because of the limited sample size and missing evaluation data, there is also a risk of a type 2 error. Furthermore, there is a risk that the full effect wasn’t visible within the period of follow-up. Others have previously found that the long-term effect of improving internships was much more effective than in the short term [10]. Another

factor that could have affected the evaluation scores was the percentage of students completing the evaluation, ranging from 0-100%. Regarding the quality assessment of the internships, the low evaluation percentage is a challenge. The evaluations are not mandatory for students, and, therefore, methods addressing this issue should be strived upon. Even though the student evaluation questionnaire covered topics and aspects other researchers have found to be important when evaluating internships [16, 17, 18, 19, 20], it is a limitation that the questionnaire is not validated. However, the evaluation percentages increased when departments had a focus point regarding evaluation, indicating that the CTF has the potential to address this issue as well. Others have found that social perspectives are also important to reduce stress, struggle, and anxiety in internships. Social perspectives such as relationships and developing learning environments between students and staff, and students in between, increases team building and student engagement. This perspective was originally not a part of the primary focus for the CTF, however, because the CTF can constantly develop, this will be in mind for future meetings [26]. Throughout the many meetings during the study, the CTF learned new ideas and suggestions to improve internships constantly, thus increasing the amount of knowledge and ideas. These potential improvements were passed at the meetings with the following departments. It is a strength that the CTF can constantly evolve and pass on knowledge, however, it is a limitation that the departments at the beginning of the study period were not introduced to all of the same ideas and knowledge, and thereby making the meetings more heterogeneous. In future implementations, it could be considered to include follow-up meetings, where further knowledge sharing is possible.

In perspective, some key elements need to be fulfilled to ensure that evaluations are used to improve internships. These key elements are: willingness to adapt and analyze the situation; opportunities to discuss and conduct a dialogue; and plans of action [27]. Both the meeting and the focus points encouraged this, emphasized by the departments' overall high satisfaction with the meetings and follow-up (Supplementary Table 3). However, some departments didn't complete the focus points which could be because they lacked some of these key elements. Future studies should investigate why they were not completed in order to address this issue. It strengthens the external validity that the two psychiatric departments contacted CTF, whereafter the same approach was successfully used. In fact, since then CTF has met with most psychiatry, pediatrics, obstetrics and gynecology, anesthesia, and neurology departments affiliated with the University of Copenhagen.

In conclusion, the departments' satisfaction with the Clinical Task Force meetings, in general, was high, with 82–97% being “Very satisfied” or “Satisfied” with different aspects of the meeting. The CTF's effect on the mean evaluation score and parameters was limited. The student's mean evaluation scores did not increase significantly when measured one and two semesters after the Clinical Task Force meeting. Two categories changed significantly for those departments that completed the focus points within the category. The category regarding the students' satisfaction with the clinical lecturers and the schedules teaching decreased after two semesters and the category regarding the percentages of students evaluating the departments increased after one semester. Even though it was not possible to measure the effect on the evaluation scores, the CTF did successfully motivate the 53 departments to implement 126 quality-improving focus points. This indicates that the meetings with the CTF motivated the departments to implement new ideas and changes that could improve the internships. Moreover, the Clinical Task Force shared good experiences from other departments, learned about challenges that could be brought to the faculty, and shared knowledge of the faculty. Thus, it became a good viable linking element between the faculty, departments, and students.

Declarations

Ethics approval and consent to participate

This study is a quality development study and does not include any personal information. Ethics approval is therefore not required according to Danish law [28]. Students' evaluation data, which is collected by the University of Copenhagen, are anonymous and publicly available and do not require informed consent. Department representatives that participated gave consent to participate, prior to all meetings.

Author contribution statement

Jason Joe Baker: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Nina Weis; Trine Boysen; Morten H Bestle; Annarita Ghosh Andersen: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data. Anne Mette Morcke: Conceived and designed the experiments; Analyzed and interpreted the data.

Lasse Bremholm: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

Funding statement

This work was supported by University of Copenhagen.

Data availability statement

The authors do not have permission to share data.

Declaration of interest's statement

The authors declare no conflict of interest.

Acknowledgements

We would like to thank Betina Ristorp Andersen and Henrik Arendrup for their contribution to the Clinical Task Force. We would also like to thank all the student representatives from the students' council who participated and contributed with important student perspectives.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e13419>.

Supplementary Table 1

Explanation of clinical lectures.

The clinical lectures are lectures at the hospitals where the students have their internship. The subjects are within different specialties that are available at the hospital. The subjects do not include the entire curriculum. The curriculum is taught at the university.

Supplementary Table 2

Examples of the suggested focus points the departments had to work on The examples are only a selected few of the focus points, and most departments had individualized focus points.

- o Adjust the introduction material that is sent to the medical students.
 - o Upload the introduction material on the University's intranet.
 - o Print a picture of each student and put it at a board in the department.
 - o Give the students a student's phone during their internship or write their phone number at a board in the department.
 - o Attempt to strengthen and increase the evaluation percentage on the University's intranet, at the end of the internship.
 - o Provide the students with more feedback and do it systematically.
 - o Encourage the students to complete the evaluation.
 - o Teach in groups of two students (dyads) during clinical work.
 - o Plan 1–2 meetings a year with the Clinical Associate Professors, Clinical Professors, and Professors at the department.
 - o Give the students more specific assignments.
-

Supplementary Table 3

Results of the departments' satisfaction with the meetings with the Clinical Task Force. The electronic questionnaire was sent to the departments after the meetings. Out of the 50 meetings, with the departments of medicine and surgery, the questionnaire was completed by at least one participant in 46 of the meeting, with a total of 76 answers.

	Very satisfied	Satisfied	Less satisfied	Not satisfied	Not relevant
How satisfied were you with the information sent prior to the meeting?	28%	58%	4%	0%	11%
How satisfied were you with the self-evaluating questionnaire?	18%	64%	10%	0%	8%
How satisfied were you with the meeting and presentation?	51%	44%	4%	1%	0%
How satisfied were you with the material made available after the meeting?	21%	70%	1%	0%	8%
How satisfied are you with the plan regarding follow-up?	38%	59%	1%	0%	1%

References

- [1] A.M. Morcke, D.G. Nielsen, I.T. Kjeldsen, et al., Medical graduates feel well-prepared for clinical work, *Dan. Med. Bull.* 58 (2011) A4330.
- [2] M.C. Stefanescu, J. Sterz, S.H. Hofer, et al., Young surgeons' challenges at the start of their clinical residency: a semi-qualitative study, *Innov. Surg. Sci.* 3 (2018) 235–243.
- [3] S. Burrige, T. Shanmugalingam, F. Nawrozadah, et al., A qualitative analysis of junior doctors' journeys to preparedness in acute care, *BMC Med. Educ.* 20 (2020) 12.
- [4] J.Q. Young, S.R. Ranji, R.M. Wachter, et al., July effect[™]: impact of the academic year-end changeover on patient outcomes, *Ann. Intern. Med.* 155 (2011) 309–315.
- [5] D.P. Phillips, G.E.C. Barker, A July spike in fatal medication errors: a possible effect of new medical residents, *J. Gen. Intern. Med.* 25 (2010) 774–779.
- [6] K.E. Engelhardt, K.Y. Bilimoria, J.K. Johnson, et al., A national mixed-methods evaluation of preparedness for general surgery residency and the association with resident burnout, *JAMA Surg.* 155 (2020) 851–859.
- [7] J. Padley, S. Boyd, A. Jones, et al., Transitioning from university to postgraduate medical training: a narrative review of work readiness of medical graduates, *Health Sci. Rep.* 4 (2021) 270.
- [8] B. O'Brien, M. Cooke, D.M. Irby, Perceptions and attributions of third-year student struggles in clerkships: do students and clerkship directors agree? *Acad. Med.* 82 (2007) 970–978.

- [9] B. Burford, V. Whittle, G.H. Vance, The relationship between medical student learning opportunities and preparedness for practice: a questionnaire study, *BMC Med. Educ.* 14 (2014) 223.
- [10] M. Wahlqvist, A. Skott, C. Bjorkelund, et al., Impact of medical students' descriptive evaluations on long-term course development, *BMC Med. Educ.* 6 (2006) 24.
- [11] R.E. Stalmeijer, D.H.J.M. Dolmans, I.H.A.P. Wolfhagen, et al., Combined student ratings and self-assessment provide useful feedback for clinical teachers, *Adv. Health Sci. Educ. Theory Pract.* 15 (2010) 315–328.
- [12] G. Ogrinc, L. Davies, D. Goodman, et al., SQUIRE 2.0 (standards for quality improvement reporting excellence): revised publication guidelines from a detailed consensus process, *J. Cont. Educ. Nurs.* 25 (2016) 986–992.
- [13] F. Haji, M.P. Morin, K. Parker, Rethinking programme evaluation in health professions education: beyond 'did it work? *Med. Educ.* 47 (2013) 342–351.
- [14] D.A. Cook, C.P. West, Perspective: reconsidering the focus on "outcomes research" in medical education: a cautionary note, *Acad. Med.* 88 (2013) 162–167.
- [15] A. Teherani, D.M. Irby, H. Loeser, Outcomes of different clerkship models: longitudinal integrated, hybrid, and block, *Acad. Med.* 88 (2013) 35–43.
- [16] H.E. Daelmans, R.J.I. Hoogenboom, A.J.M. Donker, et al., Effectiveness of clinical rotations as a learning environment for achieving competences, *Med. Teach.* 26 (2004) 305–312.
- [17] R. Remmen, J. Denekens, A. Scherpbier, et al., An evaluation study of the didactic quality of clerkships, *Med. Educ.* 34 (2000) 460–464.
- [18] A. Sadeghi, H.A. Meybodi, B. Navabakhsh, et al., Clinical clerkship education improves with implementing a system of internal program evaluation using medical students' feedbacks, *Acta Med. Iran.* 54 (2016) 530–535.
- [19] S.M. Funger, H. Lesevic, S. Rosner, et al., Improved self- and external assessment of the clinical abilities of medical students through structured improvement measures in an internal medicine bedside course, *GMS J. Med. Educ.* 33 (2016) Doc59.
- [20] T.R. Moczko, T.J. Bugaj, W. Herzog, et al., Perceived stress at transition to workplace: a qualitative interview study exploring final-year medical students' needs, *Adv. Med. Educ. Pract.* 7 (2016) 15–27.
- [21] M.N. Ferrel, J.J. Ryan, The impact of COVID-19 on medical education, *Cureus* 12 (2020), e7492.
- [22] A. Akers, C. Blough, M.S. Iyer, COVID-19 implications on clinical clerkships and the residency application process for medical students, *Cureus* 12 (2020), e7800.
- [23] G.L.B. Dallaghan, C.H. Ledford, D. Ander, et al., Evolving roles of clerkship directors: have expectations changed? *Med. Educ. Online* 25 (2020), 1714201.
- [24] B. Burford, V. Whittle, G.H.S. Vance, The relationship between medical student learning opportunities and preparedness for practice: a questionnaire study, *BMC Med. Educ.* 14 (2014) 223.
- [25] M. Wenrich, M.B. Jackson, A.J. Scherpbier, et al., Ready or not? Expectations of faculty and medical students for clinical skills preparation for clerkships, *Med. Educ. Online* 15 (2010), <https://doi.org/10.3402/meo.v15i0.5295>.
- [26] A. Atherley, D. Dolmans, W. Hu, et al., Beyond the struggles: a scoping review on the transition to undergraduate clinical training, *Med. Educ.* 53 (2019) 559–570.
- [27] H.A.P. Wolfhagen, W.H. Gijsselaers, D. Dolmans, et al., Improving clinical education through evaluation, *Med. Teach.* 19s (1997) 99–103.
- [28] National Committee on health research ethics, What to Notify?, 2019. <https://en.nvk.dk/how-to-notify/what-to-notify>. (Accessed 18 January 2022). Accessed.