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Medical School Surgical Boot Camps: A Systematic Review

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PURPOSE: Many medical schools have begun to offer surgical boot camps to senior medical students. The aim of the present study is to systematically review the literature and evidence surrounding medical school surgical boot camps to direct future research into the effectiveness of boot camps.

METHODS: A systematic review was conducted, searching MEDLINE, EMBASE, PsycINFO, CINAHL, and ERIC. The review was conducted according to the PICOTS structure, with an intervention of a surgical boot camp for senior medical students entering surgical residencies.

RESULTS: The search resulted in 5351 database hits, from which we identified 10 published studies that met the inclusion criteria. Two reviews were identified that met the PICOTS criteria but were excluded from data synthesis. Boot camps increase the confidence and competence of medical students entering their surgical internships. There is no objective assessment of the effect of boot camps on the clinical performance of interns.

CONCLUSIONS: Despite the success of medical school surgical boot camps, no objective data exist to show that boot camps translate into improved performance during internship. (J Surg Ed ■:■■■-■■■. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: undergraduate medical education, surgical education, surgical boot camp, capstone course

COMPETENCIES: Patient Care, Medical Knowledge, Practice Based Learning and Improvement

INTRODUCTION

Many medical schools have recently begun to offer surgical boot camps, alternatively called capstone courses or preparatory courses, to their fourth-year students entering surgical residencies.[1] These boot camps are designed to increase the clinical and technical competence of incoming interns.[2] Two main forces have driven the development of boot camps: a concern that incoming surgical interns are not adequately prepared for the challenges of patient care,[3-5] and the idea that the fourth year of undergraduate medical education can be improved.[6-13]

In 2014, the American Board of Surgery (ABS), American College of Surgeons (ACS), Association of Program Directors in Surgery (APDS), and Association for Surgical Education (ASE) released a joint statement supporting the implementation of a surgical preresidency preparatory course by medical schools across the country.[2]

After 1 year, in the spring of 2015, the ACS/APDS/ASE publicly released the jointly developed Resident Prep Curriculum. The Resident Prep Curriculum offers specific goals and objectives that should to be achieved by boot camps, and provides tools to help implement boot camps. The curriculum was piloted at 39 institutions in 2014 and at 47 institutions in 2015.[1] The ACS/APDS/ASE have taken numerous steps to see that the curriculum is adopted at as many medical schools nationwide as possible.

The aim of the present study is to systematically review the literature and evidence surrounding medical school surgical boot camps to direct future research into the effectiveness of boot camps.

To date, there have been 2 reviews of medical school surgical boot camps.[14,15] One review, which included a meta-analysis, did not undertake a systematic review[14] and was published before the release of the Resident Prep

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TABLE 1. PICOTS Protocol for Inclusion

Population	Senior medical students in a United States M.D. program who plan to enter a surgery residency
Intervention	Surgical "boot camp," or course offered in senior year of medical school intended to prepare students for a surgery residency
Comparison	Standard curriculum
Outcome	Any metric that was designed to be improved by the intervention
Time	Fourth year of medical school, spring semester
Setting	Medical school or national workshop

Inclusion criteria: any published comparative study, except abstracts and reviews, which is written in the English language and meets the PICOTS criteria.

Curriculum. The second review included both intern boot camps and medical student boot camps.[15] By focusing our study on only medical student boot camps, we were able to expand our search to 5 databases and address gaps in previous reviews.

METHODS

The PICOTS structure (population, intervention, comparison, outcomes, time, and setting) was used to direct this systematic review process and to define the studies to be considered.[16,17] This a priori protocol (Table 1) that provides an objective method for determining which studies are to be included and excluded, and it is an important part of a systematic review.[18]

MEDLINE, EMBASE, PsycINFO, CINAHL, and ERIC were searched for studies published in the English language. Searches were completed between November 2015 and January 2016, but were not restricted by date of publication. Systematic reviews and literature reviews were noted and used for backward citation searching, but not included in the review as any data that could have been abstracted from a review was instead abstracted from the primary source. The general search strategy was to combine a term for surgery with a term for undergraduate medical education, and create various permutations and combinations using the "AND" and "OR" Boolean search operators. Detailed syntax of the searches is provided in Supplementary Tables S1-S5.

Results from all searches across all 5 databases were combined using reference management software. Duplicate references were then deleted before articles were screened for inclusion or exclusion. At the end, we conducted backwards-citation searching of all articles that were included in the study to identify any articles that may have been missed by the searches.

Article inclusion and exclusion were conducted as follows. One analyst (C.J.N.) reviewed the titles or abstracts or both of all articles identified by the searches and marked potentially relevant articles for full-text retrieval. After title/abstract review was complete, each marked article was retrieved in full text, and 2 research analysts (C.J.N. and E.F.N.) independently determined whether each retrieved article met the PICOTS inclusion criteria. Any published study that met the PICOTS criteria and was not a review or an abstract was included. Disagreements between the 2 analysts were minimal and were resolved through joint review of full-text articles and discussion with another coauthor (S.R.A.).

For quality assurance, a total of 100 initial search results (the results that underwent title and abstract review) were randomly selected and audited by a second analyst (E.F.N.). There was complete agreement between the 2 analysts.

The results of each included study were abstracted according to a modified Best Evidence Medical Education (BEME) Collaboration abstraction form and summarized by the 2 analysts (C.J.N. and E.F.N.). Evidence quality and sources of bias were not assessed as the authors determined that the qualitative nature and heterogeneity of the material reviewed did not lend itself to evidence quality assessment.

RESULTS

The search resulted in 5351 database hits, from which we identified 10 published studies that met the inclusion criteria[19-28] (in addition to 2 reviews that met the PICOTS criteria but were excluded because they were reviews).[15,29] The PRISMA diagram (Fig.) depicts the flow of the systematic review, from the initial identification of 5351 database hits to the ultimate inclusion of 10 articles.

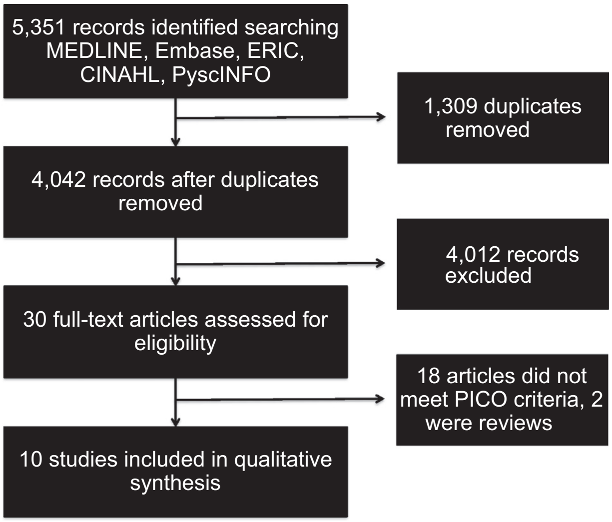

FIGURE. PRISMA diagram.

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