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## A Scoping Review of Boot Camps as a Transition, or Induction Training in Health Professions Education

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Saul Flores, Dorene Balmer, Erin Pete Davidson, Danny Castro, Brian Rissmiller, Beatriz Varman, and Satid Thammasitboon

**BEME Systematic Review  
Protocol Checklist**

**TITLE OF REVIEW**

**A Scoping Review of Boot Camps as a Transition or Induction Training in Health Professions Education**

**NAME OF LEAD REVIEWER**

**NAME: Saul Flores, MD**

**INSTITUTION: Texas Children's Hospital/Baylor College of Medicine**

**INFORMATION ON TITLE, LEAD AUTHOR AND AUTHORS**

**1. COVER SHEET**

**Abstract**

*Background*

Health professions education (HPE) has increasingly used “boot camps” as a promising approach to prepare learners for the transition to their next educational level (e.g. medical students entering residency) or before entering a specific field. However, current boot camp guidelines have not been widely developed or accepted and may have even strayed into different concepts.

*Aim*

To explore current practices of boot camps as an educational activity to transition into a new level of training or a new field in HPE.

*Methods*

Medical and education databases will be searched for studies reporting on boot camps. We will achieve our goal by 1) exploring the depth and breadth of evidence that characterizes boot camps across various disciplines in HPE, 2) synthesizing key components of boot camps to formulate an operational definition, and 3) proposing recommendations for best practices when developing an HPE boot camp.

*Importance*

This review will explore the literature pertaining to boot camps to formulate an operational definition and develop best practices of an HPE boot camp.

*Word count*

169

*Keywords*

Boot camp, medical education, scoping review

Review group members

Name	Academic Role	BEME Experience	Systematic Reviews Experience	Area of Specialty/Research
Saul Flores	Assistant Professor, Section of Critical Care, Director, Bedside Ultrasound Education, Department of Pediatrics, Baylor College of Medicine (BCM)	First time involvement with a BEME Review	Systematic reviews of research  Experience in meta-analysis	Enrolled in a Masters Health Professions Education program  Qualitative research methods  Educational research in healthcare
Dorene Balmer	Associate Professor, Director of Research on Pediatric Education, Children’s Hospital of Philadelphia	First time involvement with a BEME Review	Scoping reviews in medical education  Expertise in qualitative analysis	Qualitative research in health professions education  Education and social science theories
Erin Pete Devon	Assistant Professor, Children’s Hospital of Philadelphia	First time involvement with a BEME Review	National survey of bootcamps in pediatrics	Research on bootcamps in pediatric education  Medical student education
Danny Castro	Associate Professor, Fellowship Program Director, Section of Critical Care, Department of Pediatrics, BCM	First time involvement with a BEME Review	Educational reviews	Research in health professions education  Research on critical care bootcamp  Resident and fellow education
Brian Rissmiller	Assistant Professor, Section of Critical Care, Associate Residency Director, Department of Pediatrics, BCM	First time involvement with a BEME Review	Educational reviews	Research in health professions education  Faculty development  Resident and fellow education  Direct bootcamps for pediatric fellows

Beatriz Varman	Head of Research and Instruction, Texas Medical Center Library	First time involvement with a BEME Review	Educational reviews Experience with Meta-analysis	
Satid Thammasitboon	Associate Professor, Section of Critical Care, Department of Pediatrics,  Director, Center for Research, Innovation and Scholarship in Medical Education, Chair, Resident Scholarship Program, BCM	Second time involvement with a BEME Review,  Co-Director, BICC at Texas Children's Hospital	Educational reviews	Research in health professions education  Education theories  Evidence based medicine  Mixed Methods Research

**METHODOLOGICAL STEPS**

**2. BACKGROUND TO THE TOPIC**

The origins of boot camps may be traced to the 1800's in Elmira, New York where a new training approach was implemented to invoke discipline and to keep inmates active at the Elmira Reformatory[1]. During the Spanish-American war in 1898, US sailors wore leggings called boots, which came to mean a Navy (or Marine) recruit[2]. These recruits trained in "boot" camps. Throughout the years, armed forces across the globe have adopted boot camps as the main source of supervised, intensive, basic training. Armed forces training programs typically last several weeks and focus on individual and teamwork performance with an emphasis on accruing the basic tools necessary to perform their roles high demanding standard of performance. Factors such as discipline, continuous observations and evaluations have been attributed to the success of military boot camps. Although military enculturation can be seen as controversial, the overall effectiveness of military boot camps has inspired similar training schemes in other fields[3].

Health professions education (HPE) has increasingly used boot camps or induction training to prepare learners for the transition to their next educational level (e.g. medical students entering residency) or before entering a specific field. The impetus of this trend, particularly in graduate medical education, is multifactorial and may be due, in part, to the patient safety movement to mitigate the well-known "July Effect", limited work hours and competency-based milestones[4]. The traditional experiential clinical learning and the "see-one, do-one, teach-one" model have become obsolete as it potentially exposes patients to harm[5].

A systematic review and meta-analysis by Blackmore and colleagues evaluated the effectiveness of boot camps in improving clinical skills, knowledge, and confidence during transitions into postgraduate training in discipline-specific residency programs[6]. The authors identified 15 studies relating to boot camps, and concluded that boot camps are effective at improving clinical skills, knowledge and confidence. However, the authors highlighted the lack of uniformed design, testing strategy and recruitment as major limitations. Additionally, a systematic review and meta-analysis of surgical boot camps used in graduate medical education by Neylan and colleagues, identified 10 published studies suitable for analysis[7]. These authors reported that while surgical boot camps increased the confidence and competence of medical students entering their surgical internships, no objective assessment on intern clinical performance exists. The aforementioned

systematic reviews with meta-analyses demonstrate a paucity of data, heterogeneous nature of the program design and lack of objective outcomes for boot camps in HPE.

Despite gains in knowledge, skills and confidence, there is no clear theoretical underpinning for boot camps as an educational intervention. Hence, the authors believe that a clear description of what comprises a boot camp in HPE is warranted in order to improve differentiation of this educational endeavor from others. Characterizing boot camps will help educators to align their intended goals with this educational intervention and more thoughtfully investigate the effectiveness of the boot camp. Therefore, the authors hypothesize that most boot camp programs in HPE have strayed from the intent of boot camps originated in military. The authors assert that clarity in the definition(s) of a widely adopted educational approach or program such as a boot camp is critical to guide the development and evaluation of a program. For this protocol the authors propose a scoping review, as it will be the most appropriate approach for knowledge synthesis to understand the volume, nature, and characteristics of existing literature pertaining to “boot camps” in HPE. This scoping review will seek to: 1) explore the depth and breadth of evidence that identify essential characteristics of boot camps in HPE, 2) synthesize key components of boot camps in order to formulate an operational definition(s) for an HPE boot camp, and 3) to propose recommendations for best practice when developing an HPE boot camp.

### **3. REVIEW QUESTION(S)/OBJECTIVES, TYPE OF REVIEW AND KEYWORDS**

We determined that a scoping review is the most appropriate type of knowledge synthesis to address our research questions that are exploratory requiring realist’s view. A scoping review is a useful approach to mapping the landscape of the heterogenous body of literature around boot camps in HPE according to our preliminary searches. We will follow Arksey and O’Malley’s methodological framework for conducting a scoping review[8] with additional recommendations and steps proposed by Levac and colleagues[9] to enhance this framework.

This review will be presented in accordance with the STORIES (Structured Approach to Reporting in Healthcare Education of Evidence Synthesis) statement[10].

#### *Review questions*

1. What are purposes and prototypical components and characteristics of a boot camp from its original concept in military and/or athletic field?
2. What are the range of current practices (i.e. objectives, settings, components, instructional methods and outcome measures) of boot camps in HPE literature?
3. What are essential characteristics of or best practices for developing an “authentically effective” boot camp as a transition or induction training?

#### *Objectives*

1. To synthesize key components from literature to operationally define a boot camp as it pertains to transition or induction training in HPE
2. To conduct a scoping review of literature to identify essential characteristics of an HPE boot camp in regards to objectives, settings, components, instructional methods and outcome measures
3. To formulate critical consideration points and recommendations for medical educators and faculty developers in developing an effective boot camp based on the results of this review
4. To identify the different educational theories applied to boot camp programs in an effort to provide current best practices.

### *Process*

1. Develop a search strategy
2. Screen search findings by title and abstract
3. Conduct full text review against eligibility criteria
4. Data extraction and synthesis
5. Consultation
6. Submit review for publication and disseminate findings to facilitate peer review

### *Key words*

Transition training, Recruitment training, Induction training, Enculturation, Intensive course, Educational strategy, Educational theory, residency preparatory course, capstone course.

## **STUDY SELECTION CRITERIA**

### *Population/participants*

For the purposes of this review, we set a working definition of “boot camp” as a relatively brief and intensive educational session(s) that aims to serve as a transition or induction training to a higher level or new field. We purposefully use this broad definition instead of what is commonly defined or practiced so we may embrace emerging operational definitions of a boot camp from this review.

### *Inclusion Criteria*

- Population:  
Participant in any healthcare professions including, but not limited to physician, nurse, nurse practitioner, physician assistant, pharmacist, respiratory therapist, midwife, clinical officer
- Intervention:  
Intensive educational session(s) lasting 1 day or more to serve as a transition or induction training to a higher level or new field in health professions.
- Context:  
Health care organizations
- Outcome:  
Objectives, settings, components, instructional methods and outcome measures of the training sessions

### *Exclusion Criteria*

- Non-English language studies to minimize language bias.
- Review articles will be used to identify additional articles but will be excluded from data extraction

## **4. SEARCH SOURCES AND STRATEGIES**

We will follow the established PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and MetaAnalyses) extension for Scoping Review guidelines for our initial search and article selection process[11] An experienced research librarian helped design the search strategy.

### *Search sources*

Our search sources will target several literature databases: Ovid MEDLINE, CINAHL, ERIC, Scopus, , ETHOS, Proquest, OpenGrey and Winnower. We will also manually search the following sites: Web of Science, British Education Index, Australian Education Index. We will also search Cureus and MedEdPublish journals, Google ([www.google.com](http://www.google.com)) for other grey literature or boot camp

programs. A priori decision has been made to screen only the first 100 hits for Google after considering the time required to screen and the insignificant yield from further screening[12]. We will employ a number of search terms and concepts and their Boolean combinations.

Due to language barrier and resource constraints, we are unable to carry out searches in other foreign databases. Bibliographies of articles found through database searching will also be checked to identify further potentially relevant literature. Apart from journal articles, useful literature may include policy documents, medical school documents, conference presentations and theses, all of which may be found in the grey literature and will be a source for our search.

#### *Search Time Limit*

The search period is from the inception of the databases to March 2020.

#### *Search strategy*

A literature search of Medline Ovid will be conducted by a professional research librarian using MeSH headings (Clinical competence, educational measurement, curriculum, education professional, student health occupations and educational models) as well as equivalent keywords and phrases. Since there is not a MeSH heading for the boot camp concept, the following keywords were searched: boot camp, bootcamp, intensive training, intensive workshop, intensive learning.

The exact strategy appears in (Appendix? Supplementary material). The search strategy was then translated from Medline Ovid to CINAHL Plus with Full Text (EBSCO), ERIC (EBSCO), Scopus (Elsevier), Cochrane Library (Wiley). Embase (Elsevier), PsycInfo (Ovid) and Google Scholar (Google).

The search was conducted in Medline (Ovid) in February 2020 and translated to the other databases in March 2020. A total of 5,180 citations were retrieved in all databases. These citations were then combined into an EndNote Library and de-duplicated among themselves. A total of 3, 430 unique citations were identified.

#### *Exclusion Criteria*

None

#### *Medline Ovid Search Strategy*

1. exp Clinical Competence/ or exp Educational Measurement/ or exp Curriculum/ or exp education, professional/
2. exp Students, Health Occupations/ or exp Models, Educational/
3. (competenc\* or "education\* model\*" or "education\* measurement\*" or "education\* assessment\*" or "short-term cours\*" or "professional education" or "clinical clerkship" or "clinical skill\*" or "clinical apprenticeship" or "graduate records examination\*").ti,ab,kw.
4. ("continuing education" or "dental education" or "graduate education" or "medical education" or "nursing education" or "pharmacy education" or "public health professional education" or "veterinary education" or mentor\* or preceptorship\* or teach\*).ti,ab,kw.
5. ((educat\* or school\* or university or college or curricul\*) adj3 (medic\* or health or nurse or nursing or pharmacy or veterinar\*)).ti,ab,kw.
6. 1 or 2 or 3 or 4 or 5
7. (boot camp\* or bootcamp\* or "crash course\*").ti,ab,kw.
8. ((intens\* or crash\*) adj3 (train\* or program\* or educat\* or learn\* or cours\* or workshop\* or work-shop\* or session\* or in-service\* or inservice\* or in service\*) adj3 (day\* or short\* or week\* or month\*)).ti,ab,kw.
9. 7 or 8
10. 6 and 9

#### *Gray Literature*

A gray literature search was conducted on the following sites: The Winnower, Cureus journal, MedEdPublish, NHS Datasets and UK Department of Health and Social Care websites.



*Search terms*

The search query consisted of terms considered by the authors to describe a boot camp and its purposes or methodologies.

Boot camp, inductions weeks, orientation, clinical orientation, preparation, learning, basic-training, structure routine, accelerated skill preparation, skill course, preparatory course, nuts and bolts, basic, survival skills, depth and breadth, clinical competence, educational confidence, promote patient safety, highly focused skills, technical competency, stress hardiness, procedural skills, deliberate practice, focused training, onboarding, accelerated training, acculturation, immersion learning, cognitive skills training, management skills, skill-set development, short-format training, preparatory training, bridge training, capstone and prelude course.

The reference lists of 10 randomly selected relevant articles were manually searched to identify any further articles not yet captured. A ‘snowball’ technique will also be used in which citations within articles will be searched if they appear relevant to the review.

For the first level of screening, two reviewers (BR, DC) will independently screen the titles and abstracts of all articles in search against the inclusion criteria: If both agree the article should be included then the full paper will be sought. If both disagree the article should not be included then the article is excluded. Disagreements will be discussed with a third reviewer (ST) and a consensus will be reached. If the consensus cannot be reached, the full paper will be sought and the article included in the following stage. Duplicates will be excluded. Authors will be contacted if data is missing or needs clarification. Titles for which an abstract are not available will be included for subsequent review of the full article in the data extraction. Reviewers meet at the beginning, midpoint and at the end of the screening process to resolve conflicts and discuss any uncertainties related to study selection[9]. The authors may decide to refine the search strategies based on emerging challenges or concerns about study inclusion. All citations deemed relevant will be procured for subsequent review of the full-text articles. For articles that could not be obtained through institutional library, we will contact the source author or journal for assistance in procuring the articles. Reference managing software EndNote™ (version X9.3.1, [2019], Clarivate Analytics) will be used to store and manage references.

A follow-up search of the four databases and grey literature sources will be conducted data synthesis to identify any additional new articles published after the initial search. A search of Google with no date restrictions was also conducted at this time; only the first 100 hits will be screened.

**5. EXTRACTING DATA**

As suggested by Levac and colleagues[9], we will ‘chart the data’ for this scoping review. *Charting* is a technique for “synthesizing and interpreting qualitative data by sifting, categorizing and sorting material according to key issues and themes”[13]. A charting form developed by the authors will be used to identify demographic patterns in the dataset and facilitate data synthesis.

Author(s), year of publication, study location	
Populations	(e.g., health personnel, medical residents, nurses, etc.)

Objectives	(e.g., orientation, enculturation, recruitment)
Methods	(e.g., study design, review, commentary)
Terminology or Cited Conceptual Framework	(e.g., theories, principles, models)
Program Components	(e.g., e-learning, in-class, apprenticeship)
Instructional Methods/Strategies	(e.g., didactics, simulations, case-based learning, team-based learning)
Outcome Measures	(e.g., cognitive knowledge, skills, attitudes, patient outcomes)
Limitations	(as noted by study authors and reviewers)
Additional Recommendations/Implications	(as noted by study authors)

This form was reviewed by the author team and will be piloted by the reviewers before implementation. Two reviewers (SF, EP) will extract data from each full-text article using the form wherein information is charted by highlighting and coding relevant text using Microsoft Excel. Articles excluded at this phase if they are found to not meet the eligibility criteria. Upon independently reviewing a batch of 20 articles, the reviewers meet to determine whether their approach to data extraction is consistent with the research question and purpose. The charting will be an iterative process in which reviewers continually extract data and update the data-charting form. As suggested by Arksey and O'Malley[8] and emphasized by Levac and colleagues[9], summarizing process information, such as the use of a theory or model in a meaningful format is very critical to a scoping review. Thus, we envision significant expansion of the "Terminology or Cited Conceptual framework" category on the data-charting form and the modifications to the approaches used to chart the data for this particular category. A qualitative researcher (DB) will guide the qualitative content analysis on the initially extracted data. This step highlights the need for an integrated approach to extracting and analyzing the data to make sense of the wealth of data[9]. Given this iterative process, we will not assess Cohen's kappa coefficient for inter-rater agreement. Disagreements will be discussed with a third reviewer (ST) and a consensus will be reached.

## **6. APPRAISAL OF STUDIES**

We will not conduct a formal assessment of quality or risk of bias of the included articles, which is consistent with guidance on scoping review conduct[14].

## **7. SYNTHESIS OF EVIDENCE AND TRANSFER TO RESEARCH AND PRACTICE**

Data from the articles selected for inclusion will be compiled in a single spreadsheet and imported into Microsoft Excel 2018 (Microsoft Corporation, Redmond, WA) for validation and coding. The data will then be exported into SAS for analysis. (Copyright © [2018] SAS Institute Inc.)

Specifically, descriptive statistics will be calculated to summarize the data in terms of characteristics of included articles. This stage of analysis will elucidate the most frequently described populations, settings, methods and outcomes. This structuring in an organized table will allow for easy visualization of the most commonly reported HPE boot camp.

For the qualitative analysis, two authors (DB, ST) will conduct the initial categorization of the key components independently using Covidence.org ax. Each category will be labeled with a code. Codes will be displayed in a code template. They will discuss their initial code template as a dyad and then with the entire team until agreement is reached on which codes to include. Then team

members will apply the agreed upon code template to units of text from the articles. The framework may be modified, if upon further team discussions, new categories are identified or if existing categories do not readily fit the units of text.

Our final goal is to synthesize findings from the quantitative analysis and qualitative analysis, looking for repeated patterns (overarching themes) in the data that help to explain how boot camps worked to bring out the reported results. The preliminary results will be presented to multiple consultants and stakeholders (i.e., program directors, boot camp developers and vice chairs of education and directors of faculty development). These consultations allow opportunities for consultants and stakeholders to “build on the evidence and offer a higher level of meaning, content expertise, and perspective to the preliminary findings” [9].

Ultimately, we will propose an operational definition for a boot camp in HPE. As it is presently unclear what components or characteristics of HPE boot camps will be common in the included articles and which practices may lead to effective boot camps, the formulation of recommendations for best practices will be an iterative process through team discussions.

#### *Translation into practice*

This scoping review will assist in identifying current gaps in the literature pertaining to an increasingly used educational format, a boot camp, in HPE. Without clarity about what, why, for whom and when a boot camp could serve as effective educational session, it poses a great challenge to how it should be conducted and assessed for its merit and worth. This review will also provide medical educators and educational program developers practical recommendations in the development of future boot camp programs capitalizing on the lessons learned about effectiveness of prior studies. The impact of these expected outcomes would be improvements in HPE boot camp programs, increased knowledge, attitudes and confidence of early career professionals with associated benefits in patient outcomes.

#### *Project timetable*

Initial searches – Nov 2019

Focused searching – February 2020

Screening papers to determine inclusion or exclusion – June 2020

Review included papers and extract data – July and August 2020

Synthesize findings through narrative process – September and October 2020

Evaluation, review and dissemination – November and December 2020

#### *Conflict of Interest Statement*

No financial interest to declare.

#### *Changes to the Protocol*

At this stage, the group does not envision any major changes to the current protocol. Unexpected issues might arise and adjustments to the review topic/question, study selection criteria, and/or protocol might become necessary. If this happened: any subsequent changes to the protocol would be carefully recorded, as well as the reasoning and the date the changes took place. Any such changes to the protocol would be submitted to BEME for approval.

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