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## Research during general surgery residency: a Web-based review of opportunities, structure and outputs



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### ABSTRACT

**Background:** Academic research is an integral part of general surgery training. Despite the recent research curriculum requirements of the Accreditation Council for Graduate Medical Education, there is perceived lack of research structure for residents. The aim of this study was to identify research opportunities, structure, and academic outputs during general surgical United States (US) residency.

**Methods:** A Web-based review of all accredited general surgery US residency programs was undertaken. Individual websites were reviewed for resident research duration, type, and structure. Research outputs, departmental projects, and availability of faculty supervisors were also identified.

**Results:** Data were available for 242 general surgery residency programs of which 137 (56.6%) offer dedicated research years, ranging from 1 to 4 years, and 30 (12.4%) programs mandate such time as required. One hundred forty-two (58.7%) programs mentioned opportunities in clinical research, 129 (53.3%) in basic sciences, 29 (12.0%) in health services and outcomes-based research, and 15 (6.2%) in education. Advanced degrees were mentioned by 38 (15.7%) programs, the majority being Master of Public Health, Master of Business Administration, or Doctor of Philosophy. Nineteen (7.9%) programs mentioned research structure, mostly qualitative in description. Thirty-four (14.0%) programs provided examples of resident presentations or publications, and 25 (10.3%) mentioned a resident research day. One hundred ninety-nine (82.2%) programs offered a list of faculty supervisors and 129 (53.3%) listed examples of department research projects.

**Conclusions:** Although research opportunities are ample within surgical US residency training, programs should consider the opportunity to offer varied types of research, with the potential to pursue an advanced degree. Finally, guidelines should be developed with regard to resident research structure, process, and outcomes.

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## Introduction

Academic research is an integral part of medical residency training. Participation in research during residency increases a resident's comfort with evidence-based medicine,<sup>1</sup> enhances analytical and critical thinking,<sup>2</sup> and provides time for reflection and creativity. In addition, it has been linked with postgraduation success<sup>3</sup> and increased interest in choosing an academic career<sup>4–6</sup> by fostering research networking opportunities and ensuring an academically competitive curriculum vitae.

Therefore, to yield more academic physicians and prepare future generations of critical thinkers, a large number of residency training programs, including general surgery, offer opportunities for research experience. These research opportunities vary from one surgical residency program to another. The Accreditation Council for Graduate Medical Education (ACGME) requires residency programs to provide a curriculum that advances residents' knowledge of the basic principles of research, ensures residents' participation in scholarly activity, and allocates adequate resources to facilitate this participation.<sup>7</sup> To meet these requirements, general surgery residency programs have been putting forward an array of research opportunities such as protected research time of varying duration, dedicated research day, a research track, or a research director,<sup>8</sup> though without great cohesiveness or clear guidelines.

Furthermore, there is still much debate over the importance of these experiences with the added constraint placed on training surgeons, including the increased length of training, along with variability in residents' attitudes toward scholarly activity.<sup>9</sup> Moreover, despite standardization of the surgical training requirements and the recently published ACGME requirements, there is perceived lack of structure and guidelines for surgical residents who undertake research during their program.

The aim of this study was to identify the types of opportunities for research and dedicated time within surgical residency programs, the structure of research time during residency, the opportunities to obtain an advanced degree, and the outputs of research during general surgical residency in the United States (US).

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## Methods

### Programs

A Web-based review of information publicly available on American general surgery residency programs was conducted from August 2016 to January 2017. All programs from the accredited list of American Board of Surgery 2011–2016 were included in the study, if access to their website was possible: from the 245 accredited programs, three programs were thus excluded.

This study involved review of publicly accessible information on websites, and thus an evaluation was not undertaken by the Institutional Review Board due to the public nature of the work involved.

### Data sources

From the accredited program list of American Board of Surgery 2011–2016, one researcher accessed information about each program and their research component on their residency Website via a Google internet search with “name of institution” and “general surgery residency”. Using the main web page of the general surgery program residency, all available information on the main web page and the related sub web pages was accessed and analyzed for data collection. Information was also accessed and analyzed on surgery departmental web pages. Other institution-related pages were not accessed.

### Criteria

Criteria categories and data dictionary were identified before the website review, which was based on the conceptual basis of the structures, processes, and outcomes approach.<sup>10</sup> Individual websites were reviewed for the following structure-related criteria: duration and structure of research (mandatory research and dedicated time offered), the type of research offered (basic, health services/outcome-based research, education, and clinical/translational), and opportunity to complete an advanced degree. Websites were also reviewed for the following process-related criteria: list of available supervisors for mentoring and examples of research projects. Websites were also reviewed for the following outcomes-related criteria: research outputs by the residents (publications and presentations) and the availability of a research day.

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## Results

### Programs

A total of 245 programs were identified, the entire list of accredited programs by the American Board of Surgery. From these, three programs were excluded because their web page or information about their program was not found. The total number of programs included in this study was therefore 242.

### Duration and structure of research offered

Data were available for 242 general surgery residency programs, of which 137 (56.6%) offered dedicated research years, ranging from 1 to 4 years, and 30 (12.4%) programs mandated such time as required (Fig. 1). Of the 242 programs, 65 (26.9%) programs required research participation or research projects to be completed during surgical training years. On their website, only 19 (7.9%) programs explained a research structure, timeline, or how resident research progress is followed. Reported structure varied from one program to another (Table 1) and was mostly qualitative in description.

### Types of research offered

Different opportunities and types of research were offered by the programs to general surgical residents. From the 242

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