Review

An outcome-based review of an accredited Specialist in Blood Banking (SBB) program: 25 years and counting

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Specialist in Blood Banking (SBB) programs play an important role in preparing technologists to become leaders and contributors to the field of transfusion medicine through dedicated education and training. The SBB program at the National Institutes of Health (NIH) Clinical Center has graduated 55 students since 1994 with an overall pass rate of 96 percent for the American Society for Clinical Pathology (ASCP) SBB examination. Graduates hold positions in a variety of transfusion medicine–related fields, with hospitals, blood centers, and Immunohematology Reference Laboratories being the most common categories of employer. Projects completed as part of the program added to transfusion medicine knowledge as evidenced by publications and awards. Almost half of all projects completed led to publications (49%), and greater than 50 percent of submissions have been selected for the AABB Future Leaders Scholarship (previously known as AABB Fenwal Scholarship Award). The students have completed over 40 program value-added opportunities. This information was available for retrieval and review. In this review, we analyzed data for the last 25 years from the SBB program at the NIH Clinical Center on program statistics, student accomplishments (such as publications in peer-reviewed journals), program value-added opportunities (such as other publications and audits performed with our Quality Assurance office), and job procurement. The collected, reviewed, and organized data provided a useful internal self-assessment to review the history of our program and head into the future. ***Immunohematology* 2020;36:7–13.**

Key Words: SBB program, blood banking, outcome-based, specialist, AABB

Introduction

Specialist in Blood Banking (SBB) programs provide comprehensive training in all phases of blood banking and are accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). After successful completion of an accredited SBB program, graduates are eligible to take the SBB examination sponsored by the American Society for Clinical Pathology (ASCP) Board of Certification to receive SBB certification.[1]

Accredited SBB programs must adhere to the Standards and Guidelines adopted by the AABB and CAAHEP.[2] To ensure meeting these rules, inspectors representing AABB and CAAHEP assess SBB programs on a routine basis. The curriculum must adhere to the Standards and Guidelines, and each SBB program then develops teaching methods that address the three domains of learning and provides evidence of competency by students.[2]

On an annual basis, each program is required to complete and submit a report to the accrediting body.[1] This report is outcome-based, identifying five outcomes: (1) graduation rate, (2) SBB certification rate, (3) career advancement, (4) employer survey return rate and satisfaction, and (5) graduate survey return rate and satisfaction. Each program must document evidence for conducting regular internal reviews. Internal review results may indicate a need for improvement to the program. Thresholds have been determined for each outcome, and program managers must develop a correction plan when a program does not meet a threshold. AABB's Committee on Accreditation reviews these reports and correction plans and provides feedback allowing for ongoing process improvement.

With continuous advancements in transfusion medicine, educational programs such as SBB programs and Transfusion Medicine fellowship programs may benefit from a periodic internal review of their program's performance. This type of review provides data to analyze and determine distinct characteristics and attributes of their program. When data are available for review, managers can acknowledge successful team members, identify strengths and weaknesses, and recognize areas for improvement. This retrospective review from 1994 to the present analyzes outcomes of the SBB program at the National Institutes of Health (NIH).

Materials and Methods

Data were collected from paper documents, electronic records, and PubMed searches, and results were organized into three categories: program statistics, student accomplishments, and program value-added opportunities. Program statistics

included enrollment and attrition of students and passing rates of the SBB certification examination offered by ASCP Board of Certification. Student accomplishments included positive professional placement, submission and receipt of scholarships, and publications in peer-reviewed journals as a direct result of a student project. To obtain a broad view of the variety of student projects performed, we sorted projects into one of nine topics, which were modeled after the table of content categories used by the journal *Transfusion*, and we added a few subtopics for clarity. We tabulated program value-added opportunities, such as group and quality assurance projects, completed during the 1-year program that promoted team building, auditing, writing, and presentation skills. We retrieved publications in peer-reviewed journals authored by graduates to determine contributions made to the transfusion medicine body of knowledge post-graduation.

We collated data for this review until October 2019. Tracking graduates over time was difficult, and we could not collect or confirm some information regarding career choices or current employment status. Because our evaluation includes students who graduated in 2019, reporting of publications may also be incomplete because of the length of the publication process.

Results

Program Statistics

Student enrollment and graduation rates for the last 25 years were consistent, with an average of two graduates per year. The overall ASCP examination pass rate was 96 percent (Table 1).

Table 1. Enrollment, attrition, and pass rates for students in the SBB program at the NIH Clinical Center, 1994–2019

Parameter	SBB students (*N*)
Enrolled*	59
Graduated	55
SBB examination†	
Passed first attempt	46
Passed ≥ two attempts	6
Did not pass	2
Did not attempt	1

*24 graduating classes; no classes enrolled in 2003 and 2008.
†Overall pass rate was 96% of those who attempted.
SBB = Specialist in Blood Banking; NIH = National Institutes of Health.

Career Advancement, Scholarships, and Satisfaction Surveys

NIH graduates were able to find positions, most being employed at hospitals, blood centers, or Immunohematology References Laboratories (IRLs) (Table 2). Submission for the AABB Future Leaders Scholarship (previously known as AABB Fenwal Scholarship Award) is above 80 percent, with more than half of our submissions resulting in receipt of an award (Table 3). We initially had few submissions for the Suzanne Ledin Travel Award, inaugurated in 2006 (Table 3). In the last 5 years, however, four submissions resulted in three awards. Return and satisfaction rates of both employer and graduate surveys exceeded the 50 percent threshold, expected by the AABB's Committee of Accreditation, and had acceptable ratings (data not shown).

Table 2. Career positions in 2019 for SBB graduates from the NIH program, 1994–2019

Area of employment	SBB graduates (*N*)
Hospitals, blood centers, or IRLs	27
Regulatory/quality assurance	10
Transplantation and cellular engineering	3
Industry	3
Education	3
Unrelated to blood banking	2
Not currently employed	0
Unable to confirm	5
Retired	2
Total	55

SBB = Specialist in Blood Banking; NIH = National Institutes of Health; IRLs = Immunohematology Reference Laboratories.

Table 3. Scholarship awards for SBB graduates from the NIH program, 1994–2019

	AABB Future Leaders Scholarship		Suzanne Ledin Travel Award*	
Graduates (*N*)	Submissions, *N* (%)	Awardees, *N* (%)	Submissions, *N* (%)	Awardees, *N* (%)
55	46 (84)	24 (52)	8 of 28 (29)	3 of 8 (38)

*Initiated in 2006.
SBB = Specialist in Blood Banking; NIH = National Institutes of Health.

Student Research Projects and Other Opportunities

Close to 50 percent of student projects are published (Table 4).[3–29] Transfusion practices and immunohematology were most common topics for SBB projects (Table 5). More than half of the student projects (Table 6) were sponsored by one of the five departmental sections. Over 40 program

value-added opportunities have been completed in 25 years (Table 7).[30–49] The variety of topics covered most areas in transfusion medicine.

Table 4. Publication record for SBB graduates from the NIH program, 1994–2019*

SBB projects	*N*	%	References
All SBB projects	55	100	NA
With publications†	27	49	3–28
As first authors	21	78	3,5–11,13–17,19,20,23–29

*Based on graduation date.

†SBB student projects resulting in a publication.

SBB = Specialist in Blood Banking; NIH = National Institutes of Health; NA = not applicable.

Table 5. SBB projects and topics for SBB graduates from the NIH program, 1994–2019*

Project topic	SBB projects (*N*)
Laboratory practices	14
Immunohematology	11
Blood group genomics	8
Transplantation and cellular engineering	6
Education	5
Blood donors and blood collection	3
Donor infectious disease testing	3
Quality assurance	3
Blood components	2
Total	55

*Based on graduation date.

SBB = Specialist in Blood Banking; NIH = National Institutes of Health.

Table 6. Sponsoring section for projects from SBB graduates from the NIH program, 1994–2019

Sponsoring section*	SBB projects (*N*)
Laboratory Services Section	
Transfusion Services Laboratory	29
HLA Laboratory	8
Cell Processing Section	8
Infectious Disease and Immunogenetics Section	4
Blood Services Section	3
Office of the Chief	3
Total	55

*Section within the Department of Transfusion Medicine.

SBB = Specialist in Blood Banking; NIH = National Institutes of Health; HLA = human leukocyte antigen.

Table 7. Program value-added opportunities for SBB graduates from the NIH program, 1994–2019

Feature	Topics	Items (*N*)	Reference
Publications	ABO discrepancy	1	30
	Antibody detection	1	40
	Book review	1	39
	Competency	1	37
	Disseminated intravascular coagulation	1	43
	ISBT 128	1	31
	Massive transfusion	1	32
	Paroxysmal nocturnal hemoglobinuria	1	38
	Platelet contamination	1	34
	Platelets	1	35
	Quality	1	36
	Regulatory issues	2	44, 49
	Serologic methods	1	45
	Transfusion reaction investigation	1	33
Social media activities	Transfusion Medicine Question of the Day	4	42, 46–48
	Webcast (resolving serologic cases)	1	41
Laboratory management and education	Audits	19	NA
	cGMP module	1	NA
	Educational posters	2	NA

SBB = Specialist in Blood Banking; NIH = National Institutes of Health; ISBT = International Society of Blood Transfusion; NA = not applicable; cGMP = current Good Manufacturing Practice.

Publications After Graduation

Unrelated to projects during the SBB program, 11 former SBB graduates (20%) authored 20 publications,[20,21,24,29,32,50–65] including two SBB graduates who contributed to current SBB student publications.[20,24] Two SBB graduates were co-authors on 12 of the 20 publications,[20,21,24,51–54,56,57,60–62] and three SBB graduates were co-authors of one publication.[59]

Discussion

An in-depth SBB program review including its graduate outcomes illuminated our accomplishments over 25 years and facilitated planning for the future with implementation of changes. As advancements were made in transfusion medicine, the SBB program adapted to produce graduates poised to become leaders in this field.

NIH has offered a wide variety of project topics to SBB students. From 1994 to 2019, projects in laboratory practices

and immunohematology were the most common topics, with blood group genomics and transplantation and cellular engineering increasing each year. This change reflects the adoption of genotyping and its relevance to transfusion medicine, indicating that the selection of student projects has followed the change of current topics in the field.[66] Emerging topics in transfusion medicine—such as the evaluation of transfusion triggers, the effect of age of red blood cells at time of transfusion, blood product management, and pathogen reduction—may influence future SBB projects.[67–70] The steady presence of laboratory practice–based projects indicates that student projects have been and continue to be practical in nature.

The group activities performed in our program afforded students opportunities to apply new knowledge and skills in a safe and encouraging setting. The activities were broad and included writing, presenting, and auditing—all valuable skills toward successfully meeting the 1-year program's requirements and graduating well-rounded professionals.

Many but not all SBB student projects have led to publication. Projects that did not lead to publication may have been part of a larger study, and the results of the student's portion of the study, although valuable, were not enough to stand alone as a publication. Also, student projects involving verification of a process may have provided results valuable to the laboratory but not novel or substantial enough for publication. Other factors that may have prohibited submission for publication included writing ability, time constraints, and individual motivations of students and project mentors.

The overall SBB certification pass rate in the last 25 years was 96 percent. SBB certification or its equivalent is a qualification for some job descriptions, such as supervisor of an AABB-accredited IRL or as education coordinator of a CAAHEP-accredited SBB program.[2,71] For the few graduates who either did not pass or did not attempt the examination, jobs that did not require SBB certification were pursued.

A major program modification that occurred within the last 25 years was the switch of the program start month from January to July. This change allowed us to hold the Department of Transfusion Medicine's two training programs, the Transfusion Medicine fellowship and the SBB program,[1] concurrently to share the didactic program. Before 2005, when students graduated in January, they could fine-tune their project manuscripts and time their submissions to coincide with the AABB Future Leaders Scholarship Award deadline in late summer, approximately 6 months after graduation. Since 2006, students complete the program in July, and 1 year may pass before submission, if not submitted immediately after graduation. The increased time from graduation and new career obligations may be reasons why there is not 100 percent submission to the AABB Future Leaders Scholarship.

The number of authored papers in peer-reviewed journals written by our graduates totaled 20. Two of the SBB graduates accounted for over half of these papers. Place of employment post-graduation seems to influence rate of publications. Working in an academic research setting may influence SBB graduates to work on research projects and eventually submit publications. We limited our data collection to articles in PubMed post-graduation to address contributions to the field. There are many other worthwhile areas that we did not systematically capture, such as publications that are not listed in PubMed, participation in national and local meetings, volunteering as an assessor, and acting as a mentor—all activities that are equally important to the advancement and training in the field of transfusion medicine.

The SBB program has consistently graduated students with a high ASCP certification examination success rate over the past 25 years. Students conduct research projects that contribute to the transfusion medicine body of knowledge either through publication or through recognition from awards. Graduates find positions that allow them to use their SBB skills. The continued surveillance and awareness of new topics will continue into the coming years.

Dedication

We would like to dedicate this article to Harvey G. Klein, MD, and Sherry L. Sheldon, MT(ASCP)SBB. Dr. Klein's contributions to the field of transfusion medicine over 46 years of government service at NIH are many, yet it is his involvement in the Department of Transfusion Medicine's training programs that are missed after his retirement on 30 September 2019. His gift was the ability to ask just the right question while gently teaching at the same time. Sherry Sheldon worked for almost 30 years in government service at NIH until her early retirement on 30 April 2017. Under Sherry's direction and encouragement as SBB program director, the program produced many leaders in the field. Sherry helped these individuals realize their leadership potential.

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