

Blood collection and use in the United States: you can't manage what you can't measure

Only in recent years has the use of human blood and blood products expanded markedly. This expansion has resulted from the development of scientific knowledge regarding the use of blood in medical treatment. Increasing demands for this resource have led to the establishment of a vast complex of organizations that collect, process, and distribute blood and its products. Comprehensive information about the nation's growing blood resource has not been available.¹

After the emergence of human immunodeficiency virus (HIV) in the 1980s, concerns about blood transfusion focused primarily on product safety and the risk of transfusion-transmitted infection. It was not always thus. A decade earlier, spurred in part by a television documentary highlighting numerous deficiencies in blood services including blood shortages, indigent commercial donors, blood wastage, and post-transfusion hepatitis, public outrage at the perceived mismanagement of blood services in the United States was intense. One common view cautioned that blood was not only "tainted," but that transfusions were increasingly and inexorably outstripping the ability of the patchwork of blood collectors to meet national needs. Worries about availability closely followed fears of disease transmission. Others warned that blood was transfused too liberally and often without proper indication. The sad fact was that nobody really knew. Aside from periodic polls by the American Medical Association's Committee on Transfusion and Transplantation and the AABB's annual membership questionnaire, little information was available regarding the need, use, sufficiency, or quality of blood for transfusion in the United States. Strikingly absent was any systematic approach to collecting reliable national data suitable for rigorous statistical analysis and trending. To address these deficiencies, the National Blood Resource Program of NIH's National Heart and Lung Institute (NHLI, now NHLBI) commissioned the consulting firm Booz, Allen & Hamilton Inc. to conduct a comprehensive study of the

nation's blood resource.¹ The 1972 Booz Allen report described a fragmented US blood system, lack of effective regulation, underserved patients, and absence of comprehensive data upon which to base policy decisions. The report was instrumental in convincing the Department of Health, Education and Welfare (DHEW, now DHHS) to include in the 1973 National Blood Policy the development of data collection systems for evaluating and planning national blood needs on an ongoing basis.²

The historical events that led to our current embarrassment of riches, publication in this issue of **TRANSFUSION** of parallel surveys of national blood resources by two sets of experienced and capable investigators, are instructive.^{3,4} The original means of implementing National Blood Policy was a public/private partnership, the ill-fated American Blood Commission (ABC), announced by DHEW in 1974 and funded jointly by the NHLI and membership fees and donations.⁵ Arguably the only successful ABC program turned out to be the National Blood Data Center (NBDC). NBDC, supported by NHLBI and with dues and contributions from ABC members, developed, tested, and operated the first US national blood information system. Summary data collected by this system for 1979 and 1980 were published in 1983 by the Government Printing Office in a booklet entitled, "The Nation's Blood Resource."⁵ The good news: this initiative provided important information about the nation's blood services and developed tools to collect and analyze these data; the bad news: the booklet is out of print, difficult to retrieve, and largely forgotten; the ugly news: NBDC teetered from year to year on a private/public funding model that was doomed to fail.

Between 1979 and 1994, Surgenor, Wallace, and collaborators at the Center for Blood Research (CBR) in Boston conducted a series of seven federally funded surveys that documented important changes in the national blood resource including doubling of blood component transfusions between 1972 and 1980, conversion to all-volunteer donors, the decline of collections and transfusions in the early HIV era, the growth of single-donor apheresis platelets (PLTs), the rise and fall of autologous and directed donations, a dramatic decrease in units collected/1000 population without evidence of blood shortages, and importantly, differences between AABB-affiliated and nonaffiliated hospitals. Most of these studies can be found in the peer-reviewed literature. However, despite these successes, and related in part to unpredictable federal funding, CBR transferred responsibility

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for national surveys to a newly created research arm of AABB, the National Blood Data Resource Center (NBDRC).⁶ NBDRC, founded in 1997 as an independent, not-for-profit corporation for collecting and analyzing transfusion data, was supported jointly by an AABB grant, commercial “memberships” (Abbott Laboratories, Amgen, Inc.; Baxter Healthcare Corp.; Ortho Clinical Diagnostics, Inc.), and income generated from the Center’s research activities.⁶ It soon became apparent that whereas the many wanted these data, only the few were willing to pay for them. After conducting several biennial surveys, the NBDRC went the way of its predecessors.

This abbreviated history provides helpful background for the current publications, the DHHS biennial National Blood Collection and Utilization Survey (NBCUS); a federally funded national survey; and the AABB Blood Collection, Utilization, and Patient Blood Management Survey (AABB Blood Survey), an independent survey only of AABB members.^{3,4} Both survey instruments evolved from common ancestors, but are not identical; the information requested overlaps, but is in many respects distinct. However, after adjusting for the models, imputations, extractions from prior surveys, and data weightings, most results, trends, and conclusions look strikingly similar. Red blood cell (RBC) and plasma collections and transfusions are declining whereas overall PLT collections and transfusions are increasing. However, as noted more than 40 years ago, AABB member hospital activity does not necessarily reflect overall US national transfusion practices: more hospitals, but a declining percentage, irradiate RBCs (20.6% in 2011 vs. 16.8% in 2013), and AABB members use a smaller proportion of apheresis PLTs and more whole blood-derived PLTs. NBCUS reported that cryoprecipitate usage decreased by a surprising 46%, whereas the AABB survey reported a 54% increase. The prices paid for components differ as well. Furthermore, judging from the survey instruments, both HHS and AABB have a wealth of important information that has not yet been analyzed and submitted for peer review.

Why conduct two surveys, especially during the same time interval? The simple answer is that these studies serve different purposes and different masters. The government’s imperative is to promote a safe and available national blood supply by supporting comprehensive data collection and analysis as set forth in the National Blood Policy and the Public Health Service’s Blood Action Plan.^{2,7} Data are critical for promulgating national policies and the CDC is the appropriate arm of government for providing survey data. The AABB Blood Survey is designed to meet membership wants and needs, to gather information about AABB members within the United States and internationally, to support development of AABB policy positions, and to provide members with benchmarks. A more nuanced explanation

for overlapping surveys includes the disagreements that the contractor had regarding HHS deadlines in previous NBCUS surveys and issues of ownership and attribution of data collected using public funds. In view of these differences, arguments have been made for keeping the two initiatives independent, although some level of communication might have clarified whether the discrepant cryoprecipitate data reflected real usage differences or no more than an artifact of data collection.

Nevertheless, it is unfortunate that former partners cannot see clear to conduct a single survey that would meet public and private goals without burdening the respondents unduly. At the NIH Clinical Center, which collects, manufactures, and transfuses blood, a skilled, experienced supervisor spent the better part of three days completing the AABB Blood Survey only to find that HHS’s NBCUS asked for additional details, requiring further database queries and manual compilation. The two reports combined took an estimated week to complete. Some data were unavailable in the requested format. Without customized programs, the process was inefficient and frustrating. The result is likely to be even lower future participation in one or the other survey, currently 54.5% of AABB member hospitals and 33.3% of NBCUS hospital respondents, with less accuracy in both. There is, after all, a limit to what one can ask of volunteers.

That brings me to a few modest proposals. Both the public and the private sectors share responsibility to the donors and patients of this country to cooperate in supporting blood supply and transfusion data collection. A standing joint public/private technical committee should prepare a single survey instrument biennially, designed to allow easy collection and manipulation of subsets of data. Government must take the lead, since ensuring timely access to safe blood is clearly a public health issue—and blood, like clean water and essential energy reserves, is a national strategic resource. As the NBCUS publication indicates, data about blood supplies and uses are vital for disaster- and emergency-preparedness planning and thus warrant special government attention. The data must be made public, accessible, and transparent. The private sector might wish to analyze anonymized aggregates of the data for parochial needs and limit access to or even sell such a work product. That remains to be negotiated. Ideally, all data should be published sooner rather than later in peer-reviewed and retrievable sites. The first of several national surveys were published as booklets and are now difficult to access. A similar fate is likely to befall information that is placed only on private websites.

Finally, who should provide the financial support for blood data collection? Several funding models have already failed. Sustained public sector support seems essential to meet public health goals, but federal funding fluctuates with public interest and budgetary constraints; government

support has proved unreliable in the past. Private sector funding has been even more problematic. In a national blood service or a more rational system, the cost of data collection would be factored into the price of a unit of blood. We need to reconsider this option in the United States. It would probably cost less than 10 cents a unit. A dime seems like a small price to pay.

CONFLICT OF INTEREST

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