



RESEARCH ARTICLE

# The first 60 years: Honoring Teratology's past, a new perspective on the future

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## Abstract

**Background:** This paper updates the history of the Teratology Society, now known as the Society for Birth Defects Research and Prevention (BDRP), for its first 60 years and describes the current strategy to position the Society to continue to advance its multidisciplinary science in the future. Common threads across our history include the positive impact of the Society's approach to sharing multidisciplinary, cutting-edge science and the collegial nature of the annual meetings.

**Aim:** In recent years, we have tackled challenging issues through periodic strategic planning sessions to improve the impact of the Society and its value to our members.

**Materials & Methods:** Archived and current resources were reviewed for this historical perspective.

**Results:** In 2019, the Society took steps to rebrand itself to clarify our mission to the broader scientific and governmental communities.

**Discussion:** Although our name has changed, the mission remains to understand and prevent birth defects and disorders of developmental and reproductive origin.

**Conclusion:** As BDRP, we continue to promote the exchange of research and ideas, provide educational opportunities, influence policy through advocacy, and evolve our communications to better serve our members and to have a greater impact on the health of future generations.

## KEYWORDS

BDRP, birth defects, history, teratology

## 1 | INTRODUCTION

In 2019, a majority of Society members voted to revise the organization's name from the Teratology Society to the Society for Birth Defects Research and Prevention (BDRP). This action was taken with the perspective that a healthy future for the Society needed an identity that would clearly communicate the research, mentorship, and advocacy that our members conduct and to advance our understanding and prevention of abnormal development. Yet actions to rebrand the Society were also taken

with the acknowledgement that our reputation for advancing cutting-edge science, advocacy for birth defects prevention, and support for future generations of scientists was due to the foundation that was laid by our forebears. Those individuals created, shaped, and nurtured the standards of our Society.

Excellent accounts of the history of the Teratology Society have been published in 1985 (Wilson & Warkany, 1985), in 2000 (Shepard et al., 2000), and again in 2010 (Shepard et al., 2010, as updated by J. M. Rogers). The last of these marked the 50th anniversary of the

Society. Readers are recommended to peruse through those publications to understand, in engaging detail, how the Society was established and flourished over the years. Much of the information about the formative years described here was thoroughly outlined in those earlier publications.

In the short summaries that follow, it will be apparent to those who have attended the Society's annual meetings that many program topics have evolved over the years. The review herein is intended to mark the 60th anniversary of the Society, acknowledging key achievements that fueled efforts to further our impact on the science for future generations. As noted by Shepard et al. (2000), "A history should record and honor the past, help plan for the future, and entertain the reader."

## 2 | YEARS 1 THROUGH 10: 1961 TO 1970

The Teratology Society was founded by Josef Warkany, James G. Wilson, and F. Clarke Fraser (Figure 1) in 1960, with the first meeting held in Cincinnati, Ohio, in 1961. Each founder became, in turn, the first three presidents of the Society. Wilson and Warkany (1985) reported that creation of the Society was preceded by several efforts to hold conferences to exchange scientific ideas and findings. The organization was less structured than today, with fewer committees, less documentation, and minimal costs. Shepard et al. (2000) noted that the informality could lead to opportunities for students to share dinner seating with mentors, a networking aspect that continues and is encouraged to the present day.

The first issue of the journal, *Teratology*, was dated February 1968. The first article in the issue was a



**FIGURE 1** Society founders in the late 1950s. Left to right: James Wilson, F. Clarke Fraser, Josef Warkany (shown in Shepard et al., 2000, and as updated in 2010)

biographical sketch of John Ballantine, listed as an obituary despite his death in 1923. Interestingly, the first issue presented findings on the effects of prenatal exposure to botanicals (steroidal alkaloids), hormones (thyroid stimulating hormone), pharmaceuticals (Actinomycin D, puromycin, carbonic anhydrase inhibitors), genetic susceptibility (strain differences in cleft lip in inbred mice), nutrient deficiencies (riboflavin), and in vivo/in vitro comparison. Little did anyone know that these topics would become recurring concerns throughout the history of our Society, and many would be the central tenets of future meetings. By the end of this first decade, the Society would be incorporated, the first vaccinations to prevent rubella would become available, and registries would be established for congenital malformations.

## 3 | YEARS 11 THROUGH 20: 1971 TO 1980

The second decade of existence was one of growth for the Society. Abstract submissions were roughly doubled from the earlier years; poster sessions were included for the first time in 1975 (Shepard et al., 2000). Recognition of the interdisciplinary nature of research into birth defects was the topic of an address to the Society in 1972. Scientific topics were diverse, including environmental effects to the central nervous system, placental morphology, postnatal effects caused by prenatal exposures, DNA repair, biomechanical mechanisms, preclinical testing, and ethical issues for molecular biology. Presentations and a session on fetal alcohol syndrome were first noted for the Society during these years, one being a joint session with the Behavioral Teratology Society, a group that later merged into the Neurobehavioral Teratology Society, now known as the Developmental Neurotoxicology Society. The Young Investigator Award was initiated in 1979.

## 4 | YEARS 21 THROUGH 30: 1981 TO 1990

The third decade of the Society illuminated the connections between science, advocacy, and regulatory advancements. One illustration of this was the advancement of understanding how vitamins can impact pregnancy outcomes. The Society's Public Affairs Committee (PAC) was formed in 1981, with the first Society Position Paper, *Recommendations for vitamin A use during pregnancy*, published in the journal in 1987. This position statement addressed the risks of excess vitamin A consumption, summarizing the

**FIGURE 2** Participants in the 37th annual volleyball game in 2019. The volleyball game is traditionally held in the early morning of the last day of the meeting and attracts participants from trainees to past-presidents



existing data across species, doses, and synthetic forms as well as vitamin A itself. It detailed the need for further research into matters such as dose–response relationships and mechanisms to quantify risk, and provided recommended considerations for lowered dosage in supplements. The document emphasized the need to inform women of reproductive age about the risks of excessive vitamin A intake during pregnancy.

Not all vitamin-related advances were about excessive use. Richard Smithells' seminal studies on the value of vitamin supplementation, specifically folic acid, to the prevention of neural tube defects, led to advances in mechanistic research and regulatory changes. As noted by Godfrey Oakley in the earlier history of the Society (Shepard et al., 2000), Teratology Society advocacy was influential to the FDA decision to fortify enriched grains with folic acid, an action taken by many other countries also.

The 1980s were also a decade of advancements in methods and platforms, such as transgenic mice and the formation of new malformation registries. Diverse topics such as diabetic embryopathy, developmental biology, apoptosis, homeobox genes, thresholds in developmental toxicity, and maternal-fetal pharmacokinetics were included in meeting programs. Organizationally, the International Federation of Teratology Societies was formed in 1981, comprising the Australian, European, and Japanese Teratology Societies as well as the Teratology Society in North America. In addition, the Student Affairs Committee became a standing committee in 1989. Also in 1989, International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human

Use (ICH) guidelines were drafted to harmonize teratology testing through cooperative efforts between scientists in the regulatory and industry sectors. The first annual meeting volleyball game was held, and has become a yearly, early morning tradition (Figure 2). The President's gavel was created by Society President Casimer Grabowski and has been handed from the outgoing to the incoming president each year on the final day of the annual meeting.

## 5 | YEARS 31 THROUGH 40: 1991 TO 2000

Strategic planning for the Society was a mark of the fourth decade. Long-term financial security and controlled meeting costs became necessary goals and were accomplished by initiating a strategic partnership with a management group during this period. Other considerations were to improve interaction with like-minded societies to strengthen the Society's identity beyond our membership borders. In 2000, a decision was made to split the journal into three parts with related but distinct content. Negative connotations surfaced about the use of the term “teratology” because of its original Greek meaning (*monsters*). This tenor did not align with the central mission of our Society.

Pragmatic considerations did not deter scientific excellence. Meeting programs continued to reflect advances in biomedical research techniques into molecular mechanisms. Embryonic signaling pathways, guidelines to evaluate hormonally mediated effects, and efforts

to improve therapies for pregnant women through FDA drug classifications and postmarketing drug surveillance, as well as many other topics, were all present within the meeting programs. The PAC drafted the Society's second Position Paper, *Teratology society consensus statement on use of folic acid to reduce the risk of birth defects*, in 1997. The Teratology Society's third position paper, *Developmental toxicity of endocrine disruptors to humans*, was published in 1999 with the conclusion that the data at that time were insufficient to support a position on whether environmental chemicals contributed to human developmental disorders, but identified the types of information that would provide answers to these questions. Reintroduction of thalidomide as an approved treatment for Hansen's disease led to the Society's fourth position paper, *Thalidomide*, with recommendations that the FDA monitor both the enforcement of their restrictions to its use during pregnancy and of pregnancy outcomes when the inevitable misuse occurred. Fortunately, in 1997 the Organization of Teratology Information Specialists (OTIS) began to hold the majority of their annual meetings in conjunction with the Teratology Society. OTIS provided, as it does to the present day, a significant resource of medical dysmorphology expertise that strengthened research advancements across mechanistic and clinical investigations.

## 6 | YEARS 41 THROUGH 50: 2001 TO 2010

Emerging technologies as a means to understanding the etiology of birth defects across the lifespan of an individual was a recurrent theme of annual meeting programs during the fifth decade. Advances in genomics, proteomics, microRNAs, developmental programming, and stem cell research were some of the fields that readied developmental toxicology for the 21st century. The potential uses of high-throughput systems and modeling alternatives for risk assessment and regulatory purposes were discussed as options for improved evaluation of hazardous exposures. The interpretation of the spectrum of adverse effects due to in utero exposure—lethality, birth defects, growth reductions, functional deficits—acknowledged the potential fetal origins of adult diseases, as well as shaped our understanding of postnatal development to support pediatric drug research for years to come. Clinical teratology topics included the implications of maternal disease and obesity to birth outcomes and maternal health.

The Society's second and third strategic planning sessions occurred in 2002 and 2007, respectively. Focus areas were the annual meeting, science informing public

policy, society management, our educational activities, and forms of communications to members such as the journal and website. Advocacy on behalf of the Society was led by PAC through a series of position papers on *Fetal alcohol syndrome*, *Smoking*, *Obesity*, *Causation in teratology-related litigation*, and *Pregnancy labeling for prescription drugs*. The first edition of the Teratology Primer was published in 2005. The Primer was written by scientists who shared their expertise on the development of complex organisms and on how and why development can go awry. Topics ranged from how birth defects are diagnosed, to the impact of genes or environmental exposures, to ethical considerations, to maternal conditions and the role of the placenta in development. Lastly, a move to strengthen the ties with our sister society in Europe led to the formation of an exchange lecture in 2009. Yearly, this highly anticipated debate led by one scientist from each society is based on a current topic common across the two organizations.

## 7 | OUR MOST RECENT 10 YEARS: 2011 TO 2020, AND A LOOK FORWARD TO OUR FUTURE

“Alternative” and “emerging” were adjectives that described both the science and the Society in our most recent decade, founded on a philosophy of “bench to bedside to community” science (Curran et al., 2013), leading to dramatic changes not just in how science is conducted but also how we communicate our research. The tools available to birth defects researchers at the “bench” have ranged from computational modeling to high throughput data to embryonic stem cells, zebrafish, tissue cultures, and microphysiological systems (e.g., organ on a chip). This also marked the decade of discussions on adverse outcome pathways, a means of describing causally linked events at different levels of biological organization that lead to an adverse effect. Clinical research has addressed alarming public health issues such as the opioid epidemic, recreational agents such as alcohol, vaping, and marijuana, infectious agents such as Zika and most recently COVID-19, as well as the risk/benefit of therapy during pregnancy including antidepressants, gene therapy, and immunomodulators. During each annual meeting, we continue to highlight the effects of environmental exposures on prenatal and postnatal development, as well as our growing understanding in the area of pediatric drug development. In addition, we continue to update the membership on current topics and updates to pregnancy registries. Attendees benefit from several symposia co-sponsored each year with OTIS and DNTS. During this decade, the Society created an Innovator Award to

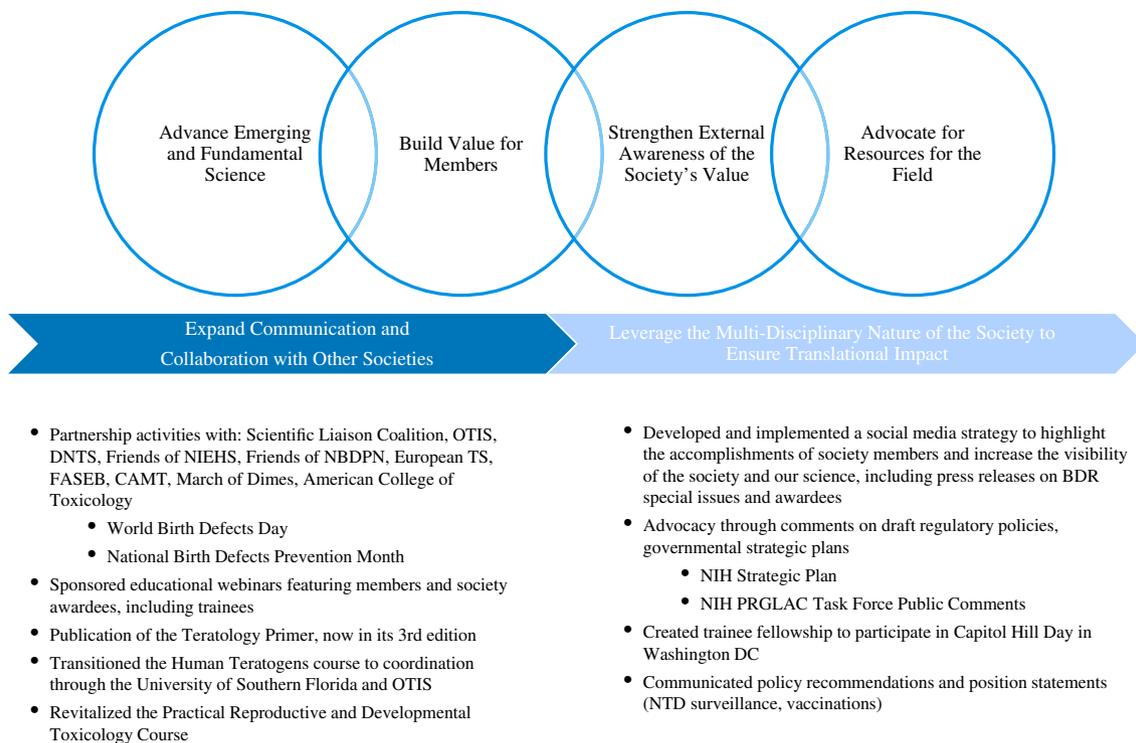
TABLE 1 Abbreviated history of the annual meetings 2011 to 2020

Year	President	Annual meeting location and theme	Warkany lecture	Continuing education courses	Mini-course
2011	J. M. Rogers	Coronado, CA <i>Translational Research in Birth Defects: From Mechanisms to Epidemiology</i>	<i>A tail of mice and men, embryos and ethanol</i> (Kathleen Sulik)	1. From bench to community: Methods for identification of novel teratogens: Session I: Preclinical developmental toxicity studies; session II: Postmarketing surveillance studies and communication of risk	Developmental biology of zebrafish model and stem cells
2012	J. M. Graham	Baltimore, MD <i>Global Perspectives in Teratology</i>	<i>An epidemiological enterprise: from fluoride to folate</i> (J. David Erickson)	Maternal and fetal immunology: Implications for the prevention of birth defects and infections	Understanding microRNAs (miRNAs) and their role in human disease and teratogenesis
2013	E. W. Carney	Tucson, AZ <i>Application of Cutting-Edge Technologies to Improve Assessment, Treatment, Prevention, and Communication regarding Birth Defects</i>	<i>A random walk through teratology</i> (Robert J. Kavlock)	1. Principles of teratology; 2. Advanced technologies in prenatal and postnatal screening and diagnosis from basic science to clinical applications	Advanced technologies in genetics and genomics: Applications to the prevention of birth defects and the communication of risk
2014	E. Z. Francis	Bellevue, WA <i>Pushing the Boundaries of Birth Defects Research</i>	<i>Teratology v2.0: building a path forward</i> (Thomas B. Knudsen)	1. Frontiers in developmental biology; 2. Mechanisms of abnormal embryonic development	Applications of computational biology in the study of birth defects
2015	M. A. Smith	Montreal, Quebec <i>Understanding Birth Defects and Reproductive Health: From Basic to Translational Research</i>	<i>Developmental toxicology: putting the puzzle together</i> (William Slikker Jr.)	1. Occupational and environmental exposures: Reproductive and developmental hazards in the workplace and home; 2. Ethics and ethical implications	Life in the genetic fast lane: Gene manipulation and genome editing to understanding congenital diseases
2016	T. E. K. White	San Antonio, TX <i>New Horizons in Birth Defects Research</i>	<i>Framing our birth defects questions with systems biology: learning from our mentors</i> (Elaine Faustman)	1. Embryology in modern times; 2. Development and teratology of the heart	Big Data

(Continues)

TABLE 1 (Continued)

Year	President	Annual meeting location and theme	Warkany lecture	Continuing education courses	Mini-course
2017	S. A. Rasmussen	Denver, CO World <i>Spotlight: Elevating Birth Defects Research</i>	<i>Eliminating congenital Zika syndrome: lessons learned from rubella elimination</i> (Jose Cordero)	1. Renal development: Embryology, renal abnormalities and teratogens, and clinical management and treatment; 2. Epigenetics: A primer	Epidemiology: Basic concepts, study designs, and practical applications
2018	A. M. Hoberman	Clearwater Beach, FL <i>Mechanisms, Models, Mothers and Babies: Bringing Birth Defects Research into Practice</i>	<i>The arrangement of teratology</i> (John DeSesso)	1. Embryology and development of the central nervous system: From prenatal period to adolescence; 2. Assessment and management of developmental effects on the central nervous system: From the molecular level to the clinical setting	Role and function of the placenta in pregnancy
2019	D. L. Shuey	San Diego, CA Sea <i>Changes in Birth Defects Research and Prevention</i>	<i>Developmental toxicity of perfluorinated compounds: A voyage from animal studies to transfected cells</i> (Barbara Abbott)	1. Embryology and teratology of the reproductive system; 2. The principles of teratology	Adverse outcome pathways
2020	C. P. Curran	Charleston, SC (moved to virtual format) <i>Honoring Teratology's Roots, Growing a Healthier Future</i>	<i>POPs: A plethora of developmental effects</i> (Linda Birnbaum)	1. Embryology and toxicity of the developing immune system; 2. Juvenile toxicology	Assessment of ovarian toxicity



**FIGURE 3** Strategic priorities for BDRP and highlights of implemented actions

recognize significant advances in the field of birth defects research, and one session at each meeting is devoted to a Research Needs Workshop which brings together scientists from multiple disciplines to identify emerging research needs requiring transdisciplinary or convergent science approaches. Lastly, every year, the Program Committee holds a spot in the agenda for a Hot Topic selected prior to the annual meeting based on current events or emerging discoveries in birth defects research and prevention. A brief synopsis of the annual meetings for the years 2011 to 2020 can be found in Table 1.

Strategic planning sessions held in 2012 and 2017 (Figure 3) updated our efforts from earlier planning sessions. In 2012, the session identified three strategic intents: broaden our identity, expand our membership, and increase our influence. These reflected member survey feedback that their top priorities were leading-edge science and impact in our field as well as the practical necessities of research funding and membership renewal. The broad multidisciplinary nature of birth defects research was seen as both an opportunity for cross-cutting insight and a driver to develop partnerships with other like-minded scientific, biomedical, and clinical organizations (Curran et al., 2013). The Society intensified efforts to continue activities that provided members value, such as expanded continuing education opportunities, and stepped up outreach activities for visibility to a

wider audience for improved funding, expanded membership, and greater influence upon public health and funding decisions. Our need to coordinate communication across the various committees and segments of our membership led to the formation of an ad hoc Communication Working Group that later became the Communication Coordination Committee, a standing committee.

The most recent strategic planning session for 2017 to 2022 (Hoberman, 2018) built upon the planning in 2012, with updated member input. The 2017 session identified “Strengthen the Impact and Relevance of the Society” as our central challenge opportunity, with the following four strategic priorities:

- advance emerging and fundamental science;
- build value for members;
- strengthen external awareness of the Society's value; and
- advocate for resources for the field.

Two additional cross-cutting priorities were identified as essential elements to the success of the above:

- expand communication and collaboration with other societies, and
- leverage the multi-disciplinary nature of the society to ensure translational impact.

**TABLE 2** Society awards and recognition

<b>Award</b>	<b>Year established</b>	<b>Criteria and background</b>
Josef Warkany Lecture	1985	Selection is by the president of BDRP from a list of nominated candidates who need not be a member of the Society. The award recognizes a scientist who has significantly contributed to the fields of birth defects research over their career. The award is named for founder Josef Warkany.
Wilson Presentation Award (trainees)	1989	Finalists are selected from applicants for student and postdoctoral fellow travel awards and give a platform presentation during the annual meeting. The recipients are selected by the Student Affairs Committee. The award is named for Society founder James G. Wilson
F. Clarke Fraser New Investigator Award	1998	The recipient must be within 10 years of completion of their training, active in BDRP, with evidence of a successful, independent research career through funding, publications, teaching, or recognized expertise. Selection of the recipient is by the Awards Committee. The award is named for founder F. Clarke Fraser.
Marie Taubeneck Award (trainees)	1999	The award is open to graduate student and postdoctoral fellow BDRP members in recognition of scholarship and service to BDRP. Criteria are involvement in the Society, leadership, mentoring, courage to pursue novel approaches, and recognition by fellow trainees. Nominees are identified by polling BDRP members, including peers. The recipient is selected by the Student Affairs Committee. The award is named for Dr. Marie Taubeneck, 1993 predoctoral winner of the Wilson Presentation Award and a promising young investigator in the Society.
James G. Wilson Publication Award	2000	This award is selected by the editor and section editors of Birth Defects Research from publications within the BDR journal during the previous year. The selection criteria are originality, approach, and impact for research on the mechanisms of abnormal development or developmental susceptibility. The award is named for founder James G. Wilson.
James C. Bradford Memorial Poster Award (trainees)	2000	This award is presented for the best poster presentation by a student or postdoctoral fellow during the annual meeting of BDRP and DNTS. Criteria consist of the poster subject and impact, clarity of information presented, appearance, and the presenter's knowledge as evaluated by the judges. It is jointly sponsored by the Middle Atlantic Reproduction and Teratology Association (MARTA), DNTS, and Sanofi-Aventis. The award is named for Jim Bradford, a past president of MARTA and an influential, involved member of the Society.
Agnish Fellowship	2006	The fellowship recipient is selected by the BDRP Awards and Education Committees to a long-standing Society member for significant contributions to education in birth defects research or a related field. The award is named for Dr. Narsingh Agnish in recognition of his contributions to the Society, particularly for his support of the Education Course over many years.
Robert L. Brent Lecture	2008	The lecturer and lecture topic are selected by the Annual Meeting Program Committee and intended to facilitate discussion of a human prenatal toxicant. The award is named in honor of past president Dr. Robert Brent, a highly respected clinical teratologist, Warkany lecturer, and recipient of the Distinguished Service Award.
Edward W. Carney Distinguished Service Award	2010	The recipient must be a member for at least 10 years, served the Society as a committee chair, Council member, or Editor, provided leadership to the Society, and demonstrated a productive career in birth defects research and prevention. Nominations are by a member of BDRP and selected by the Awards Committee. The Distinguished Service Award was renamed to honor Dr. Edward Carney following his unexpected death in 2015.
Distinguished Scholar Award	2014	The award is sponsored by Wiley Publishing and given to the senior author of the selected publication. Preliminary selection is based upon citations for the papers over five to 10 years. Final selection by the Awards Committee also considers the impact of the paper to birth defects research and the overall publications of the author for innovation, originality, and depth.

**TABLE 2** (Continued)

<b>Award</b>	<b>Year established</b>	<b>Criteria and background</b>
Patricia Rodier Mid-Career Award	2015	This award is jointly sponsored by BDRP and the Developmental Neurotoxicology Society (DNTS). The recipient must be between 10 and 20 years from training, and have an independent research and mentoring career. Special consideration is given to nominees that conduct research into the central nervous system or demonstrated mentorship. Nominators can be members of either BDRP or DNTS. Recipients are selected by the DNTS and BDRP Awards Committees. The award is named for Dr. Patty Rodier, a past president of DNTS and former member of Council.
Edward W. Carney Trainee Award	2016	This award provides travel funds for a graduate student or postdoctoral scholar to attend a professional meeting such as BDRP or SOT. Criteria are the scientific quality of their abstract, overall impact to the field of developmental and reproductive toxicology, and career goals in these fields. Preferential consideration is given to members of BDRP or SOT. The presidents of BDRP and the SOT Reproductive and Developmental Toxicology Specialty Section serve as co-chairs for the selection committee. This award was established in honor of Dr. Ed Carney, past-president of both BDRP and SOT RDTSS.
Innovator Award	2018	Finalists are selected from abstracts submitted for the annual meeting, based upon innovative and translational research cross-cutting two or more disciplines of basic science, new technologies, clinical research, policy, and/or outreach. All finalists give platform presentations during the annual meeting. Selection of the recipient is by the Awards Committee
FASEB Howard Garrison Public Affairs Fellowship	2019	The fellowship provides travel funding for a graduate student, postdoctoral scientist, or early career investigator to participate in FASEB Capitol Hill Day activities. The recipient is selected by the BDRP Public Affairs Committee based upon active interest in scientific policy, advocacy, or communication, or STEM community outreach actions. This award is named in honor of FASEB Director of Public Affairs Dr. Howard Garrison, now retired.
Student and Postdoctoral Fellow Travel Awards		This award provides travel funding to assist students and postdoctoral fellows with expenses to attend the BDRP annual meeting. Students and postdoctoral fellows who are BDRP members and have abstracts accepted for presentation are eligible.

Examples—not at all an exhaustive list—of actions to implement the strategic plan are shown in Figure 3. Actions taken to implement a social media plan, formed with the guidance of a communications consultant, have led to wider visibility of our Society and our members who are at the leading edge of our science.

Today, the Society has a new name. The transition from Teratology Society to BDRP arose from concern that the society name was not well recognized by the greater scientific community and it did not adequately represent the increasingly diverse multidisciplinary research fields that are advancing the science of understanding birth defects. The process that preceded the change began with member input to explore individual opinions and interest, followed by focus groups to consider alternative name ideas and a well-attended discussion at the 2018 business meeting during the 58th annual meeting. External feedback from non-member speakers—that is, scientists making advancements of interest to our members—was solicited to better

understand how our society name was perceived. The final choice for the society name was the highest rated alternative and approved by a majority vote of Society members. The name change was followed by an updated logo. The rebranding of the Society's identity has been followed by public communication efforts to raise awareness within our membership and outwardly through society partnerships and social media: “New Name, New Logo, SAME Critical Mission” (Curran, 2019).

New means to communicate to members and to a broader scientific audience utilizing social media, webinars, press releases, blogs, and partnerships with sister societies have been added to our communication profile. As an example, the press release for the BDR Special Issue on fetal alcohol spectrum disorder in 2019 triggered the interest of science journalists internationally, and a series of papers published in BDR Part C (*Embryo Today*) pertaining to the microbiome in developing fetuses resulted in an article in *Time* magazine. Our organization

joined forces with sister organizations for social media thunderclaps and twitter chats to disseminate birth defects prevention information for National Birth Defects Prevention Month and World Birth Defects Day. The Society continues to utilize position papers to advocate for sound science and public health policies on topics such as *Iodine deficiency during pregnancy and lactation*, a *Resolution on folic acid fortification*, *Marijuana use during pregnancy and lactation* (an endorsement of a statement from the American Congress of Obstetricians and Gynecologists), and *Surveillance and prevalence estimation of neural tube defects*. As Coronavirus (COVID-19) began its march across the world late in 2019, several

Society members were coincidentally in the midst of drafting a position paper on vaccinations during pregnancy, published in 2020, *Joint position statement on vaccines*.

In 2020, due to mounting global health concerns with the Coronavirus pandemic, Council members voted to transition the annual face-to-face meeting to a virtual platform. While the face-to-face meeting has been a cornerstone for advancing our multidisciplinary science, we also view this as an opportunity to explore and use a platform that has the potential to reach a broader scientific audience and continue to align with the goals of our strategic plan. Despite the pandemic, sharing emerging discoveries, from basic scientific and epidemiological research to translational applications in the clinic, will prevail.

Over the years, BDRP established lectures and awards to recognize scientific contributions and service to the Society while honoring founding and influential members of our Society and our field (Table 2; Figure 4). This practice began with the first Josef Warkany Lecture in 1985 and continued through the inception of a fellowship that enables an early career member to participate in Capitol Hill Day to experience first-hand advocacy on public policy. A detailed listing of each award/awardee and special lecture is outlined on the Society's website. Additionally, financial travel awards are presented to pre- and postdoctoral members with abstracts that are accepted for presentation at the annual meeting. In addition to sharing our multi-disciplinary science, we strive to build value for our members and trainees through professional development workshops at the annual meetings and committee participation. Building value for our members incorporates an understanding that members from all segments of our



**FIGURE 4** Past president Ed Carney presenting past president Rich Miller with the Distinguished Service Award in 2013. This award was renamed the Edward W. Carney Distinguished Service Award after Ed's unexpected death in 2015



**FIGURE 5** Past presidents of the Society. Back row, left to right: William Slikker Jr., Elaine Francis, Jan Friedman, Alan Hoberman, Melissa Tassinari, John DeSesso, John Rogers, Tom Knudson, George Daston, Dana Shuey. Front row, left to right: Tacey White, Sonja Rasmussen, Anthony Scialli, Mary Alice Smith, Elaine Faustman, Jose Cordero

Society are offered the opportunity to be involved with society activities and navigate us toward our future.

Our Society originated through the diverse but linked interests of the founders. These interests remain the cornerstone of our Society. Today, BDRP is home to leaders in government, industry, academic, and clinical sectors (Figure 5), and it provides a unique setting for trainees to meet, interact, explore career paths, find mentors, and form lasting connections. The Society strives to encourage, engage, and mentor trainees, recognizing that they represent the future of both the Society and the important scientific work necessary to fulfill the mission to understand and prevent birth defects. Society members still embody the scientific insight, passion for healthy infants, and collegiality of our founding fathers as we continue their legacy as a forum to share ideas on the causes, diagnoses, treatments and prevention of birth defects and developmental disorders.

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#### CONFLICT OF INTEREST

The authors have no conflict of interest and no funding source for the preparation of this manuscript.

#### DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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