Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Editorial

Introduction to issue of highlighted research presented at the 2015 National Foundation for Infectious Diseases Annual Conference on Vaccine Research

Vaccines represent one of the most successful public health measures in history. Their development has led to complete elimination of the only human disease ever eradicated, smallpox, as well as eradication of one of the three polio serotypes [1,2]. In the United States alone, routine immunization of children with vaccines against 13 diseases has been estimated to prevent more than 19 million cases of those diseases in each birth cohort, along with averting more than 42,000 deaths [3]. However the development of safe and effective vaccines is required for the many remaining infectious diseases for which vaccines are not available, as well as a counter to the unexpected emergence of new and deadly pathogens. Further, there remains many areas for which existing vaccines have suboptimal effectiveness or safety; characteristics that may be improved upon. Moreover, some vaccines are underutilized and interventions are needed to improve uptake.

The National Foundation for Infectious Diseases (NFID), established in 1973, has a long history in educating the public and healthcare professionals about the causes, prevention, and treatment of infectious diseases. In the mid-late 1990s, Drs. Greg Poland, Bill Martone and Len Novick, then senior leaders with the NFID, put forth a proposal to the NFID Board of Trustees for the formation of a new conference with the goal of creating a scientific forum to bring together the diverse and distinct disciplines that constitute "vaccinology". This vaccine focused conference would be designed to address key challenges to optimizing prevention or treatment of disease through vaccination, and would bring together scientists, public health officials, philanthropic and non-governmental organizations, industry, and healthcare practitioners. Development of this concept was pursued with discussions among individuals at a range of small and large external organizations. Among these, Dr. Regina Rabinovich of the US National Institutes of Health National Institute of Allergy and Infectious Diseases (NIH-NIAID) and Drs. Walter Orenstein and Bruce Weniger at the US Centers for Disease Control and Prevention (CDC) served as key participants in establishing the inaugural conference. This meeting that came to be known as the Annual Conference on Vaccine research (ACVR), was to encompass a broad range of topics related to vaccinology from basic pathogenesis and early vaccine development all the way to vaccine policy and optimal use to minimize disease burden. Thus, it was distinct from research meetings that were narrowly focused on specific antigens or narrow disease targets, or where vaccinology topics received narrow focus as part of limited sessions at large infectious-disease congresses.

Since the 1st iteration in 1998, ACVRs give persons interested in vaccinology an outstanding opportunity to hear from the world's experts in the field, present their own work, and interact with colleagues with the potential to develop or enhance collaborations. Several major features have defined these meetings. A primary goal has been to welcome papers on all disease targets and research issues, in order to encourage cross-fertilization and communication among researchers and developers of diverse vaccines at the upstream, middle, and downstream ends of the proverbial "vaccine pipeline". Another distinguishing feature has been its semi-didactic nature, in which fully half the 3-day conference is allocated to usually six plenary symposia, for each of which three or four experts deliver invited presentations on a broad range of timely specific topics selected by its planning committee, varying from year to year (Table 1). The remaining half of time is devoted to concurrent oral sessions comprised of papers selected by planning-committee review of unsolicited abstracts submitted by conference attendees. Accepted posters are viewable throughout the three days. The ACVRs have featured participation and major addresses by preeminent vaccinologists, and have thus provided an environment where young researchers can interact with some of the leading and pioneering scientists in the field. The focus on cross-generational interactions is further reinforced by the conferring of awards at the meeting for both early-career young investigators (sponsored by Merck in honor of Dr. Maurice Hilleman) as well as lifetime achievement in vaccinology (sponsored by Sanofi Pasteur in honor of Dr. Charles Mérieux). It is also the usual venue for awarding the Albert B. Sabin Vaccine Institute's Gold Medal for extraordinary contributions in the field of vaccinology or a complementary field.

The 2015 edition of the ACVR well-illustrated the breadth of state of the art in the field of vaccinology, as well as cutting edge science to address some of the problems that have prevented development of safe and effective vaccines against a variety of pathogens and diseases. There were six invited symposia with topics that included: (1) Accelerating Development of Impeded Vaccines, (2) Glycomics in Vaccine Development, (3) New Vaccine Candidates, (4) Innovations in Assessment of Vaccine Efficacy, (5) Immunogen Design and Discovery, and (6) New Vaccines: Beyond Infectious

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Table 1
Samples of representative symposia topics of the Annual Conferences on Vaccine Research, 1998–2016, each usually featuring three or four invited-expert presenters (*personal communication*, Bruce G. Weniger). Topics are repeated every few years for updates. See www.nfid.org/professional-education/archives/acvr for complete listings.

Symposia topics	ACVR iteration (year)
Adjuvants and immunomodulators	1st (1998), 11th (2008), 13th (2010), 15th (2012)
Adolescence vaccines	9th (2006)
Antibody maturation and immune protection	7th (2004)
Antigen processing and presentation	2nd (1999)
Antimicrobial resistance, vaccines for combating	19th (2016)
Auto-immunity	4th (2001)
Bioterrorism agents, biodefence vaccines, dangerous exotic disease vaccines	2nd (1999), 4th (2001), 6th (2003)
Cancer, chronic disease, and non-infectious disease vaccines	4th (2001), 18th (2015)
Clinical and field trial design, vaccine efficacy	1st (1998), 5th (2002), 18th (2015)
Clinical trials in developing countries	2nd (1999)
Combination, multimeric, chimeric vaccines	1st (1998), 8th (2005)
Conjugate vaccines	8th (2005)
Control and eradication of diseases by vaccination	3rd (2000), 16th (2013)
Correlates of immunity, surrogate markers	1st (1998)
Cutaneous vaccination	11th (2008)
Developing-country vaccines, needs, manufacturing, immunization technologies, programs	2nd (1999), 6th (2003), 7th (2004), 12th (2009), 13th (2010), 17th (2014)
Ebola vaccines	18th (2015), 19th (2016)
Economics of vaccines: industry-public health interface	3rd (2000)
Emerging and reemerging disease vaccines	19th (2016)
Epidemiologic effect on disease patterns by vaccination	6th (2003)
Ethics of vaccine research	4th (2001)
Genetic determinants of immune response	2nd (1999)
Genomics for vaccine R&D	3rd (2000), 7th (2004), 14th (2011)
Global alliance for vaccines and immunization – research and development agenda	5th (2002)
Glycomics and carbohydrates in vaccine development	18th (2015)
Herd immunity, indirect protection	9th (2006)
Herpesvirus vaccines	14th (2011)
HIV/AIDS vaccines	2nd (1999), 5th (2002), 14th (2011), 19th (2016)
Host/pathogen factors, seromolecular epidemiology, natural disease vectors	10th (2006)
Hot topics in immunology	6th (2003)
Human papillomavirus vaccines	5th (2002)
Immune evasion mechanisms	1st (1998)
Immune response differences: developing vs. developed countries	9th (2006)
Immune response: effect of aging	1st (1998), 3rd (2000), 9th (2006)
Immune response: neonates	3rd (2000)
Immunization programs, policies, strategies, introduction, implementation, utilization	6th (2003), 17th (2014), 19th (2016)
Immunocompromised host vaccination, other special populations	10th (2007), 14th (2011)
Immunologic advances, novel strategies, issues	8th (2005), 9th (2006), 17th (2014)
Immunological memory	5th (2002), 10th (2006)
Immunology basics for vaccine development	5th (2002)
Influenza vaccines and immunization, emergency pandemic vaccines	8th (2005), 11th (2008), 13th (2010), 17th (2014)
Innate immunity	3rd (2000, 11th (2008)
Malaria vaccines	1st (1998), 6th (2003), 8th (2005), 12th (2009, 16th (2013)
Maternal immunization to protect the fetus and newborn	1st (1998), 10th (2006), 16th (2013), 19th (2016)
Meningococcal vaccines	4th (2001)
Needle-free vaccination	1st (1998), 7th (2004)
Nosocomial Infections vaccines	6th (2003)
Oral and enteric vaccines	8th (2005), 15th (2012)
Recently-licensed vaccines (human papillomavirus, rotavirus, 4-valent meningococcal, varicella-zoster)	11th (2008)
Regulation of vaccines, general, for public health emergencies, for adjuvants	3rd (2000), 7th (2004), 17th (2014)
Regulatory/Suppressor T cells	6th (2003)
Respiratory infection vaccines	3rd (2000), 16th (2013)
Rotavirus vaccines	15th (2012)
RSV vaccines	6th (2003)
SARS (severe acute respiratory syndrome)/coronavirus vaccines	7th (2004)
Sexually-transmitted disease vaccines	3rd (2000)
Therapeutic vaccines	2nd (1999), 8th (2005)
Tuberculosis vaccines	2nd (1999), 9th (2006), 12th (2009), 16th (2013)
Vaccine development: new and innovative approaches, immunogens, vaccines, trends, technologies, strategies, alternative animal models, impeded vaccines	4th (2001), 5th (2002), 10th (2006), 13th (2010), 14th (2011), 15th (2012), 16th (2013), 17th (2014), 18th (2015)
Vaccine safety surveillance and research	4th (2001), 9th (2006), 12th (2009), 15th (2012
Vaccine shortages and supply	6th (2003), 8th (2005)
Veterinary vaccines and comparative models of disease and protection, synergies with human vaccine development, One Health	1st (1998), 12th (2009), 14th (2011)
Veterinary vaccines for zoonotic diseases, economically important food animals, conservation medicine, differentiating infected from vaccinated animals	5th (2002), 6th (2003), 9th (2006), 13th (2010), 15th (2012)

Diseases. These symposia included more than 20 presentations by leaders in their respective fields, on a large range of vaccine-related topics including talks on Group A Streptococcal vaccines, Therapeutic Vaccines against Alzheimer's Disease, Dengue Vaccines, Regulatory Considerations in Vaccine Effectiveness Evaluation, HIV1 Vaccine Progress, and Curative Potential of T Cell Transfer Immunotherapy for Cancer. In addition to the invited talks, there were 33 selected presentations from submitted abstracts covering an extensive array of vaccinology related topics in sessions ranging from the science of immune responses, preclinical and clinical studies of a variety of vaccines, vaccine effectiveness in disease prevention, vaccine safety and public perception, vaccine design, and vaccine administration and policy. The 2015 Charles Mérieux lecture honored Dr. D.A. Henderson for his many contributions to controlling/eradicating vaccine-preventable diseases including his leadership of the smallpox eradication program, while at the World Health Organization. Other awardees included Dr. Matt Moore, who presented the Robert Austrian Memorial Lecture entitled "Preventing Pediatric Pneumonia around the World: Challenges and Opportunities" and Jesse Erasmus, the Hilleman Awardee, who discussed "Development of the Eilat Virus, a Host-Restricted Alphavirus, as a Vaccine Platform". A closing Panel Discussion also covered Updates on Ebola Vaccines in Development.

This special section of Vaccine includes articles based on a subset of the invited presentations at the conference, and covers widely divergent themes within vaccinology. Dr. Christopher Broder et al. [4], assemble an overview of the epidemiologic rationale and current status of Nipah/Hendra Virus Animal Vaccines. This includes a description of the pioneering work from his lab to develop both a highly effective subunit vaccine based on the surface glycoprotein, as well as a promising monoclonal antibody against this protein that could be used for passive transfer immunoprophylaxis. Dr. Barney Graham [5] provides a comprehensive summary of new generation vaccines against Respiratory Syncytial Virus; a major childhood illness for which vaccine development has proven challenging. As part of this review of the field, he also summarizes some of the groundbreaking work from his group at the NIH Vaccine Research Center to elucidate the protective immune responses to the RSV surface fusion (F) glycoprotein, as well as the generation of a soluble molecularly stabilized pre-fusion form of this protein. Dr. Clifford Snapper [6] highlights work from over two decades of research efforts in his lab to decipher the immune responses to *S. pneumoniae* capsular polysaccharides, including a description of some of the critical determinants required for induction of anti-polysaccharide antibodies. Finally, Dr. Peter Hotez and colleagues [7] detail the impetus and rationale for vaccines to control infections with helminths in the developing world; a major cause of disability and despair in populations where these pathogens are endemic.

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