GVIRF 2014: Workshop 6: Innovation in vaccine delivery and presentation: How can technological advances increase program performance?	
Rapporteurs: **L. Wolfraim, R. Hall and L. Gordon**	
Session Outline	**Chair: M. Gottlieb & R. Lagos** **Presentations:** D. Zehrung, O. Ronveaux, D. Kristensen **Discussants:** O. Popova
Objectives of the session	• To discuss options to critically review program gains and possible incentives to accelerate uptake of next generation vaccine delivery approaches. • To define how new vaccine delivery technologies can increase immunization program performance and how to measure the gains, not only in terms of immunization coverage/program performance, but also in terms of cost-savings
Main outcome	Innovations in vaccine technology, delivery, and presentation present exciting opportunities to enhance the impact and cost-effectiveness of almost every vaccination program. However, it is difficult to incentivize innovations that involve multiple industries, regulators, implementers, agencies, NGOs, and national governments. A framework for evaluation of innovation in vaccine delivery technologies and comprehensive cost-effectiveness can facilitate an integration of the communities involved in the research, development, regulatory, and implementation issues and help overcome this challenge.
Summary (400-500 words)	Innovation should not stop at licensure of a new vaccine. Established vaccination programs can achieve greater coverage and cost-effectiveness by improving product presentation and delivery. Opportunities include needle-free technologies that simplify administration, improved packaging that reduces costs and saves space, and alternative routes of administration that can reduce costs and improve immunogenicity. Two case studies illustrated the opportunities and challenges of innovation in vaccine delivery and presentation. The first case study showed the dramatic impact of a novel provision in the license for the MenAfriVac used to extend coverage. The manufacturer developed high-temperature stability data supporting a license provision permitting up to 4 days out of the cold chain at temperatures up to 40°C. This allowed immunization teams in Benin to transport vaccine into remote areas where there was no cold chain, dramatically enhancing access and coverage in the most challenging settings. The experience is currently informing improvements to the implementation of cholera, yellow fever, and HPV programs. The second case study illustrated the challenges and opportunities raised by the Uniject® system, first developed over 30 years ago, and only recently overcoming barriers to broader use. Uniject® exemplifies the difficulties in applying new devices to licensed vaccines, and the need to balance the initially higher manufacturing costs of the Uniject presentation against the poorly-quantified system benefits of ease-of-use on health care worker training and qualifications, vaccine wastage, transportation, safe needle management. Key lessons from Uniject® are the sheer scale of the barriers to innovation, lack of incentives for innovation, regulatory hurdles, and the poor measurement of available gains in cost-effectiveness. The key to adopting new ideas appears to be facilitating collaboration, interactions, and cross-training among key stakeholders and policy-makers; and by using more system-wide metrics of economic and public health benefit to find the best opportunities. New incentives are needed to catalyse the adoption, translation, and integration of innovative technologies and practices into better products and more cost-effective programs. Better opportunities for collaboration among stakeholders can improve innovation in vaccine delivery and presentation. Public health goals and preferred product profiles can guide industry innovation. Greater progress could be made through an association of innovators, product owners, regulators, implementers, customers, and beneficiaries. It is crucial that planning involves all stakeholders, and particularly seeks input from country immunization programs and national regulators and is responsive to their concerns. Engagement, education, and training of country immunization programs and vaccinators must keep pace to ensure that technology is readily adopted. While innovative technologies offer dramatic program benefits, substantial investments are required to realize their potential. It is difficult to incentivize innovations that involve multiple industries, regulators, implementers, agencies, NGOs, and national governments. Accurate system-wide metrics for cost effectiveness and public health impact will help identify and build the case for innovations to existing vaccines.

Key references or quotes (up to 5)	• Project Optimize: http://www.who.int/immunization/programmes_systems/supply_chain/optimize/en/ • Lydon et al., Economic benefits of keeping vaccines at ambient temperature during mass vaccination: the case of meningitis A vaccine in Chad, Bulletin of the World Health Organization. 2014. http://www.who.int/bulletin/volumes/92/2/13-123471/en/