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Global equity and timely access: COVID-19 & beyond 23rd DCVMN Annual General Meeting 2022 report

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ABSTRACT

The 23rd Annual General Meeting of the Developing Countries Vaccine Manufacturers' Network (DCVMN), co-hosted by Serum Institute of India (SII), gathered over 365 delegates and more than 90 high-level speakers for three days of presentations, discussions, and networking, in Pune, India. The meeting provided a platform for vaccine manufacturers from developing countries to voice their experience, challenges and successes, as they play a critical role in the global research, development and supply of vaccines for achieving vaccine equity through increased collaborations and partnerships. The key topics of the 23rd Annual General Meeting revolved around: the key learnings from COVID-19, pandemic preparedness, vaccine sustainability and scalability, strengthening Africa's local manufacturing, partnerships & collaborations, financing, innovations, and vaccine hesitancy. The overarching theme focused on equity, timely access and sustainability, which was carried through in each session, with each panelist providing their contribution to answering - how can we create a sustainable vaccine ecosystem?

Introduction

The Developing Countries Vaccine Manufacturers' Network (DCMVN) held its 23rd Annual General Meeting (AGM) from 20th to 22nd October 2022; the first being held in a hybrid format after two years of meeting virtually due to the pandemic. The meeting was co-hosted in Pune [1] by Serum Institute of India (SII) [2] and inaugurated by Dr Mansukh Mandaviya, Honorable Union Minister of Health and Family Welfare and Minister for Chemicals & Fertilizers Government of India. It gathered over 365 delegates and more than 90 high-level speakers for three days of presentations, discussions, and networking. This event is a crucial platform for vaccine manufacturers from developing countries to voice their experiences, challenges and successes with global stakeholders.

Throughout the 13 highly productive sessions, there was a clear red thread - vaccine equity and timely access. The key topics that arose from the conference consisted of the role played by developing countries' vaccine manufacturers (DCVMs) during COVID-19, the lessons learnt, and how these lessons can be used to equip themselves for a better pandemic preparedness and create a sustainable vaccine ecosystem. Consequently, to establish a good supply of vaccines local manufacturing in Africa needs to be increased and to create a successful eco-system for innovations is the key. Lastly, to ensure that all the above-mentioned work is not wasted countries must tackle vaccine hesitancy and increased uptake.

Covid-19 and lessons learned

DCVMs played a crucial role during the COVID-19 pandemic by manufacturing ~ 60% of the global COVID-19 vaccine doses to protect billions of people worldwide especially in LMICs. The speed at which the DCVMN members and the vaccine industry as a whole has responded and tackled this pandemic has been praiseworthy. Dr. Tedros Adhanom Ghebreyesus (WHO) applauded the achievement of DCVMs in technology and manufacturing and underlined the failure in terms of equitable access to the COVID-19 vaccines and disruption of immunization services. Dr. Seth Berkley (Gavi) further underlined the significant impact made by DCVMN members in the battle against vaccine inequity, as nearly 30% of the total supply of COVAX doses have been directly contracted from DCVMN members, with others playing key role in the supply chains of other manufacturers. Indeed, one of the main take-away from this AGM is that local and regional capacities only can

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solve local public health challenges of this magnitude and there cannot be dependence on neighbors or different continents.

From a brighter perspective, the pandemic has brought vaccination to the top of the agenda, grabbing the attention of policymakers, investors, and the public in general, highlighting that vaccines are the most cost-effective health intervention during such pandemics. In 2021alone, it was estimated that vaccination programmes for COVID-19 saved an estimated 20 million lives globally [3]. Investment in capacity building, improving supply chains, innovative technologies, harmonizing regulatory systems, technology transfers, infrastructure and local vaccine delivery systems is crucial to achieve an equitable and timely access to vaccines.

Mr. Adar C. Poonawalla (Serum Institute of India) highlighted that a reason behind their successful increase in manufacturing capacity was the support of the Indian government, which issued permissions and licenses at record times. Numerous speakers underlined the importance of keeping these timelines short and using the COVID-19 momentum so that not only go back to business as usual, but learn from that process and then map it against how we tackle the registration and regulation of future products in pandemic and non-pandemic situations [4]. Throughout the conference there have been numerous calls for the need for a harmonized regulatory system, to eliminate hurdles and ease trade and regulatory barriers between different countries, so that sharing of knowledge and experience together with vaccine distribution can be facilitated [5]. Nonetheless, as highlighted by Dr. Soumya Swaminathan (WHO) quality and efficacy guarantees must be upheld to establish reliable coordination and acceptance between international regulators so that their judgement will be accepted regionally.

Pandemic preparedness & vaccine production scalability and sustainability

Dr. Mansukh Mandaviya, Honorable Union Minister of Health and Family Welfare and Minister for Chemicals and Fertilizers, Government of India, echoed the necessity of an easy supply of raw materials, strong standards and processes and a proper arrangement for quality control (Fig. 1).

The main lesson learnt is the need for improved pandemic preparedness and sustainable scaled -up production. The Pandemic Preparedness & Response panel voiced the importance of strengthening surveillance systems and R&D laboratories to be better prepared against future pandemics. The goal is to develop a holistic approach towards a pandemic preparedness response, including but not limited to: predictive models, free flow of goods, expeditious identification, characterization of strains, shrinking of R&D and manufacturing timelines, tech transfers, and related challenges, scaling up and scaling out, regulatory harmonization and early risk funding [6].

During his opening address, Mr. Sai D. Prasad (Bharat Biotech) called for a pandemic treaty or convention to rise above political and financial barriers, as it is important that countries allow the free flow of goods, services and knowledge on intellectual property, especially during pandemics. Nevertheless, in the process of creating international pandemic preparedness treaties and capacity building plans, such as CEPI's 100 Day Mission [7], it must be kept in mind that each manufacturer has its own environment, capacity and capabilities and therefore they must be adaptable to best fit each manufacturer's strengths, as brought to attention by Prof. Mauricio Zuma Medeiros (Bio FioCruz). The fundamental aim is to have multiple manufacturers contributing to the market, with different technologies, within 100 days. Once this is achieved, it will demonstrate the success in evaluating development and deployment pathways and roadblocks, anticipating the benefit risk and prove the establishment of a sustainable vaccine ecosystem.

Unfortunately, during the COVID-19 Pandemic certain behaviors made the equitable accessibility to vaccines much more challenging, such as hoarding, restrictions and vaccine nationalism. Lessons need to be drawn from this in order to strengthen pandemic prevention, preparedness and response, and political will, free trade and flow of supplies, inputs and outputs lie at the heart of this. Multilateral negotiations need to be fortified to protect against export bans and restrictions at times of global health emergencies, a balance must be achieved between protecting national interests and protecting global public good. Ms. Tania Cernuschi (WHO) further underlined that even without export restrictions, better rules for the distribution of scarce medical supplies at times of scarcity need to be put in place to ensure global equity and timely access to vaccines. To tackle such problems the WHO is convening the Intergovernmental Negotiating Body to draft a negotiated mutual convention, agreement or other international instrument that focuses on eliminating the restrictions and barriers on prevention, preparedness and response. The aim should be to have more transparency and better oversight on vaccine production plans, distribution and pricing.

A big aspect regarding the pandemic preparedness discussions revolved around maintenance of existing manufacturing base and sustainable capacity building [8]. During the "Capacity Building - Connect to Protect" session, speakers touched upon the importance of securing pre-qualifications successfully to build back vaccine capacity, the importance of developing an end-to-end system, the importance of linking supply and demand, the importance of increased investment and workforce development, and lastly the importance of early planning considering the available tools. Dr. Jicui Dong (WHO) noted the necessity to maintain quality throughout the scaling-up process and that technology transfer is the fastest way to build capacity (Fig. 2). Having

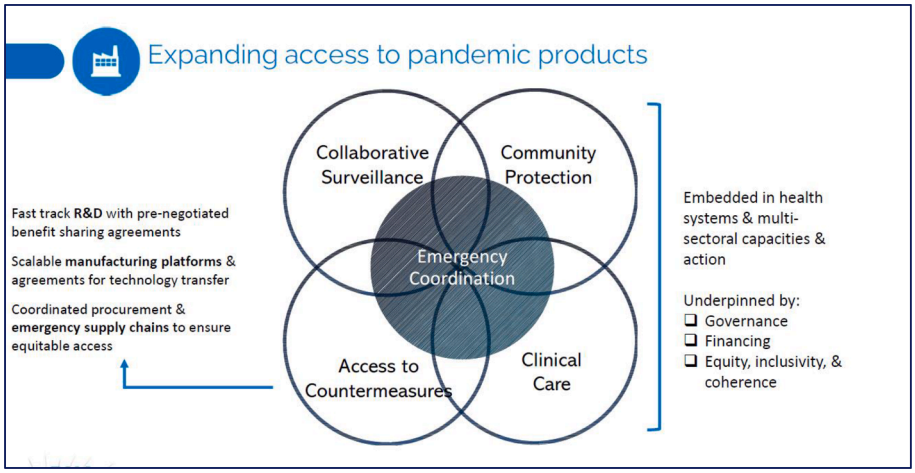

Fig. 1. WHO Sustainable vaccine production and pandemic preparedness. Courtesy of Dr. C. Chadwick, Dr. C. Nannei, Dr. M. Nicholson (WHO). Legend: The 5Cs that define pandemic preparedness and response. Coordination is the central step in every implementation and emergency. One of the 5Cs is, Access to Countermeasures, includes R&D, research and development, scalable manufacturing platforms and emergency supply chains. The goal is to improve health security in LMICs to establish a sustainable regional production of vaccines.

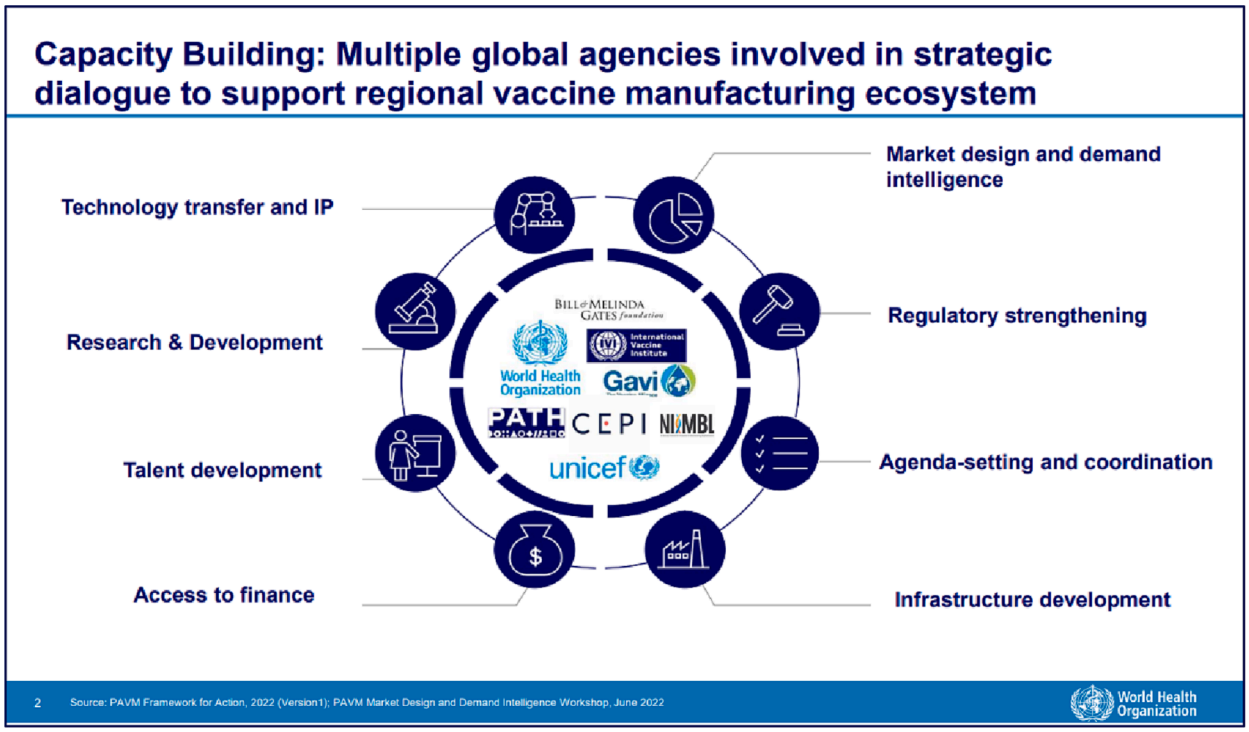

Fig. 2. The global agencies that are involved in the strategic dialogue to support the regional vaccine manufacturing ecosystem, and their key work focus areas in supporting capacity building. Courtesy of Ms. Christina Liu (WHO). Legend: A number of global agencies: the Gates Foundation, the WHO, the International Vaccine Institute. GAVI, PATH CEPI, NIIMBLE and UNICEF; that are involved in the strategic dialogue with the WHO vaccines unit, to support the regional vaccine manufacturing ecosystem. Together they cover the range of topics to make capacity building possible such as but not limited to: regulatory strengthening, market design and demand intelligence, technology transfer and IP, and R&D.

recognized the importance of technology transfers, DCVMN in collaboration with Hilleman Laboratories, launched the Hilleman-DCVMN Technology Transfer Training Program for vaccine manufacturers to learn, share and impart knowledge on vaccine production, and specifically in the tech transfer process and requirements.

A problem with scalability, is demand maintenance, in other words the art of balancing emergency responses with the potential risks taken by the manufacturer. Ms. Christina Liu (WHO) argued for a coordinated approach to capacity expansion handling, through improving communications with public and private sectors. She further added the importance of increasing knowledge and transparency about the global vaccine market and supply demand dynamics to prepare for increasing global access and capacity, and used the WHO Market Information for Access to Vaccines (MI4A) [9] initiative is an example of this. Ms. Ann E. Ottosen (UNICEF) described how UNICEF and Gavi support manufacturers through gradual scaling up of orders, providing access to markets and transparent demand forecasting [10].

To secure a healthy and sustainable scalability of production vaccine manufactures can be supported by specialized companies to work smarter, streamline processes and improve their facilities. Companies like Sartorius, Bioengineering, Biozeen, Telstar, Tofflon, Truking and many others assist companies to safely start large scale production and have cost effective manufacturing, from the developmental stage to the upstream and downstream processing through the supply of equipment, process optimization services and design engineering for vaccine manufacturing and calibration facilities.

Partnerships, collaborations & financing

Investing in new platforms and approaches for developing vaccines is critical for scaling development and manufacturing. However, partnerships need to be built beforehand for a long sustainable preparedness to allow quick voluntary tech transfer, funding, and research. Collaboration is the for DCVMs, especially with one another. The recent partnership between the SII and Aspen [11], in South Africa, on vaccine manufacturing has set an example for the future. Partnerships between vaccine manufacturers and developers are fundamental, but are also partnerships between different stakeholders, the regulators, the policy-makers, and the private and public financial funders [12]. Dr. Ayoade Alakija, (WHO & AU Vaccine Delivery Alliance), underlined that initiative like CEPI, must work hand-in-hand with DCVMs to have a sustainable impact and move away from top-down colonial models of the past. During his panel discussion, Dr. Amadou Sall (Institut Pasteur de Dakar), emphasized the importance of partnerships in ensuring sustainable financing, as it can bring public and private funding and in establishing collaborations to expand the manufacturing and R&D portfolios of manufacturers through capacity building. To support DCVMN members to continue to grow capacity, Mr. Nikolaj Gilbert (PATH) announced a five-year relationship with DCVMN to strengthen the existing workforce and make it more responsive to changes, with the final goal of sustainability. Furthermore, DCVMN conducts effective collaborations with WHO to have regional workshops, CEPI to establish regulatory collaboration and funding, Gavi to support with market shaping and PATH to have high technology and high value training program, all to best benefit its members.

It is applaudable how even when 95% of the product development funding had gone to the industrialized country manufacturers, vaccine manufacturers from developing countries have produced over 60% of COVID19 vaccines till end of September 2022. Nevertheless, we need to work on developing sustainable finances for outbreaks, as well as healthy markets for routine products. Dr. Richard Hatchett (CEPI) emphasized the need for strengthening institutional arrangements and financing mechanisms that are being put in place in the global architecture.

Dr. Soumya Swaminathan (WHO) elaborated by highlighting the difficulty of building a good ecosystem without government

investments. To ensure the continued commitment of different government departments, ministries and private sector elements involved, there needs to be a governance structure in place at the national level in each country to maintain political will and national funding.

To have a sustainable pandemic preparedness, more innovative financing structures need to be developed. As stated by Ms. Zeynep Ozenci Kantur (IFC) an optimal mix of public and private financing needs to be achieved to increase the level of resources, investments, accountability and commercial viability. The financial structures that need to be created should also cover the right levels of risk sharing and not only be centered around pandemics, but also general equitable access of all vaccines. Nevertheless, access to funds is not a main inhibitor, rather it is the legal environment, workforce capacity and tech-transfer partnerships that need to be in place to ensure timely access to vaccines and proper distribution of funds.

A key aspect of sustainability in this field involves ensuring that vaccines are affordable yet profitable for manufacturers to continue to operate and grow. Dr. Seth Berkley (GAVI) discussed how healthy markets secure such a balance. In the last 10 years, the cost of fully immunizing a child with Pentavalent Rotavirus and Pneumococcal vaccines has decreased by 57%, thanks to the competitiveness and innovation of DCVMs [13]. Honorable Minister Dr. Mansukh Mandaviya, supported the idea that if the scale of production is increased then the cost will come down, and appealed to governments, international agencies, and industry to come together.

Overall, sustainability is a web of interconnected stakeholders, policies, activities and processes encompassing from the high-level policy, the coordination and coherence of industrial health and trade policies to the demand and delivery of vaccines.

Africa - the future of vaccine equity and mRNA technology

DCVMs need to take the key learnings from the pandemic and look at how to use the momentum to scale up in a way never seen before. As highlighted by Dr. Derrick Sim (Gavi) new institutions, like the African Pharma Technology Foundation, should be set up to help continue to enhance and build the ecosystem. There is a great willingness to try things that are different, so that in the years to come the way that we think about investing, managing risk, building capacity, creating demand, shaping markets, and procurement, will be divergent [14].

Even if vaccine manufacturing existed in Africa way back in 1937, as of date, only 1% of the total vaccine needs of Africa are being fulfilled by local manufacturing. To make Africa self-reliant, beyond infrastructure and supply chains, we must build sustainable manufacturing capacities in Africa [15]. With the African Union having set the goal for the region to produce more than 60% of its vaccine doses by 2040, more collaboration like the one between SII and Aspen need to take place. Leveraging collaborations is the key to strengthening laboratory monitoring network to conduct high-quality clinical research and studies in Africa and advance the clinical trial approval process, which will support the whole system. Furthermore, a skilled workforce and strong regulatory steps through the Africa Medicines Agency, are crucial for Africa's independence. To help PAVM augment the Talent Development Initiative in Africa, DCVMN will collaborate to help map training needs and develop tailored programs to strengthen the workforce in the region.

Additional key enablers underlined by Dr. Nicaise Ndembi (Africa CDC) to achieving the 60% target by 2040 include [16]: market shaping, demand intelligence, access to finance, R&D, talent development, and infrastructure as the steps forward [17]. Dr. Seth Berkley (GAVI) voiced how an updated large volume-cost model can work with Africa's expansion, as it has worked for other DCVMs [18]. Ms. Emma Wheatley and Dr. Matthew Downham (CEPI) stated that building agile, resilient business models paired with sustainable finance and effective planning is both necessary and achievable, she further stated that CEPI is ready to support technology transfers, regulatory aspects and capacity building in the African region [19]. (Fig. 3).

For sustainable capacity building in Africa, the use of innovative technologies and methods is essential. The WHO mRNA Technology Transfer Hub [20] hosted in South Africa aims to introduce future relevant mRNA technology to LMICs to build capabilities, change the models for manufacturing, and allow LMICs to rapidly respond to future pandemics. As explained by Prof. Petro Terblanche (Afrigen Biologics & Vaccines), this will build a network for innovation and build research capabilities in LMICs to be able to continuously improve on mRNA technology and fill a pipeline to ensure sustainability and equitable distribution of manufacturing capacity. Dr. Tedros Ghebreyesus (WHO) and Dr. Morena Makhoana (Biovac) emphasized the importance of the mRNA Hub as an opportunity for local African manufacturing, as they can develop and grow already using the new technologies. Novel technologies, especially mRNA, will significantly speed up the development of vaccines, as they offer end-to-end economic solutions for improved efficiency and higher productivity. Furthermore, Dr. Carissa F. Etienne (PAHO), stated PAHO's support for the development and incorporation of mRNA technology into Latin America and the Caribbean, as well as bolstering the institutions required to regulate them [21]. Dr. Amadou A. Sall (Institut Pasteur de Dakar) also underlined that hosting the WHO mRNA Hub in South Africa is an opportunity for the region to build capacities, have people trained, do R&D together by building on and making research on vaccines that are relevant for Africa. The ultimate goal is to be able to diversify the vaccine portfolio and also the network

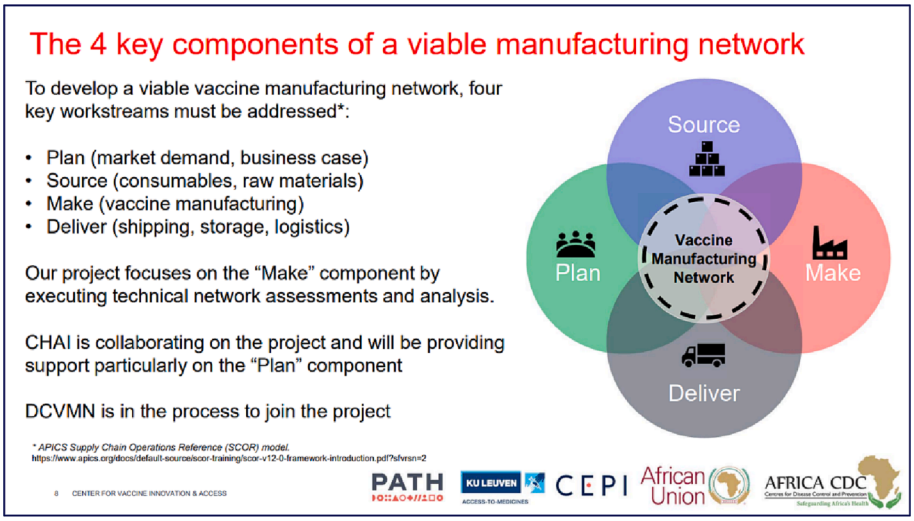

Fig. 3. Methodology to support the development of an African vaccine manufacturing network. Courtesy of Dr. Simone Blayer (PATH). Legend: To develop a sustainable vaccine manufacturing network four aspects need to be covered. The first one is planning, where PAVM and CHAI are active. The second one is sourcing where CEPI has been launching a project in raw materials. PATH is focusing on the manufacturing and partners in in the field, such as GAVI and UNICEF, are focusing on delivery. DCVMN is in the process of joining the project and providing strategic advice to this endeavor.

of manufacturers where African scientists can be trained.

Innovation - from vaccine development to delivery & administration

Training is crucial to best adopt and integrate innovative methodologies and technologies, and to ensure long-term sustainability. Dr. S. Swaminathan (WHO) stated that to have a vibrant manufacturing withing a country, you need a trained workforce and developing regional training hubs are essential for this. Ms. Julia Kuhn (BMGF) further underlined the importance of workforce development through theoretical and hands-on trainings by declaring BMGF's support for the partnership between DCVMN and NIIMBL to launch a workforce directory which will be hosted on the DCVMN website and can be used as a tool for learners and managers to identify different training opportunities. Acknowledging that training is a key aspect of sustainable capacity building DCVMN is developing Virtual Reality training modules which focus on hands-on key vaccine manufacturing steps. DCVMN Working Groups (WG) also look at providing appropriate training to members to strengthen their manufacturing capacity through workshops but also through dialogue and collaborations between experts. For example, the Regulatory Affairs WG co-chair presented the various training courses that are being developed by the WG about dossier development, clinical and preclinical trials. The Pharmacovigilance WG co-chair also stated the workshops they have in collaboration with PATH and their reviewed White Paper on Electronic Safety Data Management, written by the WG chair Ms. Linda Nesbitt (Biovac). Nevertheless, Ms. Amanda Zehnder (PATH) shared her insights on the holistic approach to employee learning, stating that learning also goes beyond training but extends to experience, fostering an organizational culture where learning is valued, on-the-job support and feedback, and good talent management practices (Fig. 4).

The driving force for vaccine equity is innovation. Innovation in this case varies from the development phase, to the ways of packaging and administration of the vaccine. Vaccine development technologies are advancing and new exciting platforms are coming forward such as mRNA, recombinant protein and the chromatographic approach to plasmid DNA presented by Merck. Furthermore, innovation in the manufacturing line equipment also holds significant impact. For instance, the Univercells Upstream platforms [22] enable a high viral throughput with a dramatically reduced footprint which helps reduce the cost of the good and facility expenditures, overall permitting the reduction of Polio vaccines to $0.30 per dose.

A great advancement in the vaccine field is the replacement of animal testing, as it is growing in desirability by international regulatory bodies, such as the WHO and EMA. DCVMN 3Rs WG chair, Dr. Pradip Das (Biological E), explained the importance of the deletion of the Abnormal Toxicity Test requirement by the WHO for monographs [23], the replacement of Rabbit Pyrogenicity Test with the Monocyte Activation Test [24] and growing 3Rs opportunities for DTP containing vaccines and for in-vitro Rabies and Hepatitis B vaccine testing. Dr. Kutub Mahmood (PATH) further underlined the importance of Next Generation Sequencing [25] as an effective animal testing alternative tool.

Ms. Rachel Park (Eubiologics) representing the DCVMN Supply Chain WG, discussed the plastic triple container oracular vaccine as an innovative packaging technology, that in the case study with Oral Cholera vaccine demonstrated advantages in storage, transportation and waste management. She further underlined that the cost of a plastic vial is inferior to a glass one, which allows the reduction of selling price by 20–30%, and the opening of the vial and administration is simplified compared to a glass vial, overall making the product more competitive in the market. Stevanato [24] also presented a new technology glass vials which reduces by 95% the silicon droplets getting into the drug product and ensures that all the components have the best functionality for syringes and cartridges.

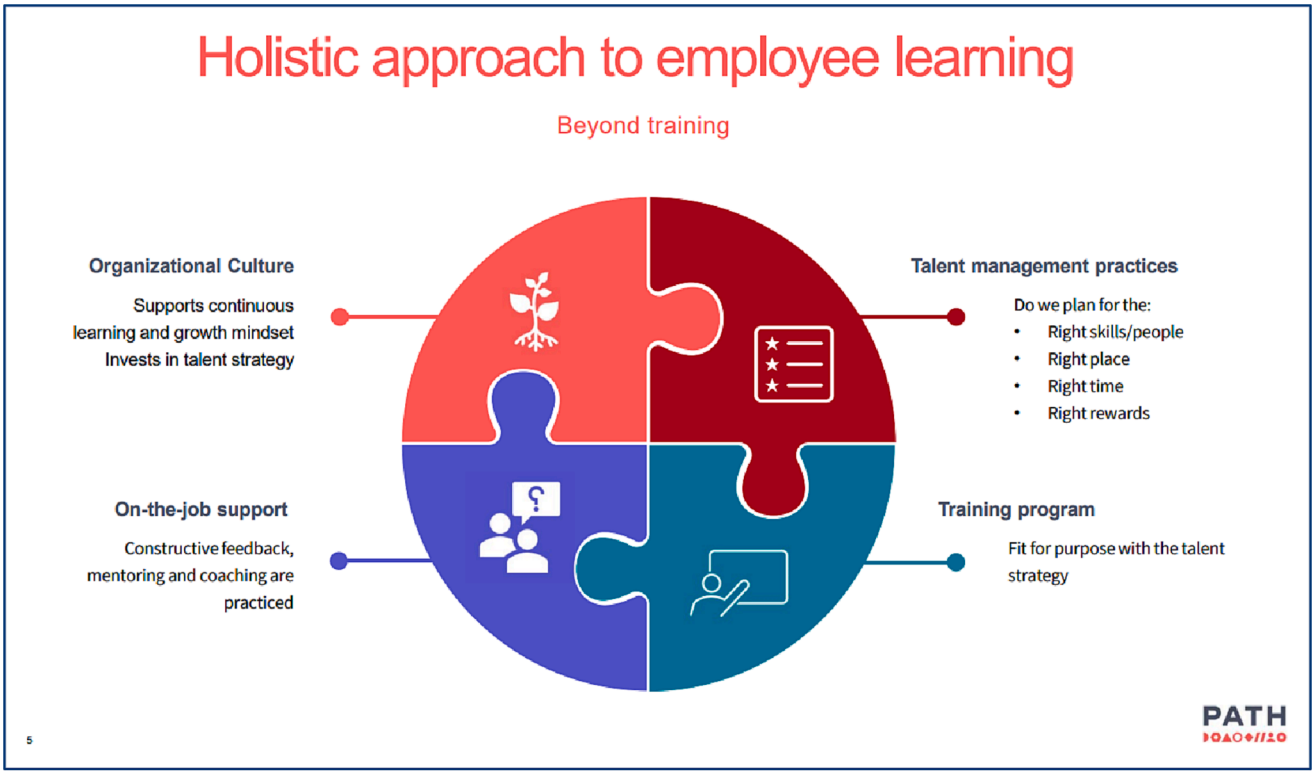

Fig. 4. Employee training goes beyond the training classroom and a more holistic approach. Courtesy of Ms. Amanda Zehnder (PATH). Legend: Learning goes beyond training, and extends to experience of the worker, an organizational culture where learning is valued, on-the-job support and feedback, and good talent management practices that can place the right person to the right task.

Vaccines are the most cost-effective public health tool for any country to prevent diseases, however it is not vaccines that save lives, but vaccinations, so prioritizing last mile delivery is a crucial aspect of vaccine coverage and equity. Therefore, innovation must extend from manufacturing to administration of the vaccines. For example, Mr. Brandon Ball (Temptime) presented the vaccine vial monitor (VVM) [2728], a thermochromic label on vaccine vials giving an easily identifiable visual indication of whether the vaccine has been kept at a temperature that preserves its potency [29]. This tool is being further improved in collaboration with the WHO, through the use of an app which allows the healthcare worker to verify the colour that they see on the VVM, thus providing more certainty that the vaccine that they are discarding needs to be discarded. These types of innovations are fundamental for effective administration of vaccines in countries where the cold chain is difficult to preserve, thus ensuring no vaccine vial goes to waste unnecessarily from heat exposure.

The development of alternative vaccine administration methods is also important to facilitate and scale-up coverage. Dr. Chunlin Xin (CanSino Biologics) and Mr. Sai D. Prasad (Bharat), presented the development of intranasal vaccines at their respective companies, which facilitates the administration and uses a reduced dose, enlarging the manufacturing capacity [30]. Similarly, the needle-free injection systems presented by Pharmajet [31] and the CEPI-supported multi-dose pouches [32], hold the same benefits of proving an easier, faster, and less wasteful administration method, as less single-use equipment and training are required compared to the traditional vaccination methods. Technologies facilitating mass vaccinations is going to be key to help mitigate outbreaks and diseases, especially in developing countries.

Digitalization is also a key aspect in pandemic preparedness, facilitating surveillance, and administration, through the use of digitalized records. The use of digital platforms can help track vaccine administrations, thus identifying those who are likely to be left behind so that we pinpoint how to reach them. Additionally, track and trace systems can be used to monitor the distribution of the vaccines until it reaches the end user, but can also be utilized to scan and verify the authenticity of the vaccine.

As much as innovations are important for the last mile delivery and administration of vaccines, primary health services and infrastructures also need to be strengthened to ensure the success of the Universal Immunization program. Business Development Director Mr. Fernando Lobos (Sinergium Biotech) and Managing Director Dr. K. Anand Kumar (Indian Immunological) underlined more single dose vaccines need to be developed in order to facilitate full coverage of populations, as in most developing countries there is a difficulty for vaccines to reach people outside of cities or for people reaching the vaccines. As stated by Dr. Marie Mazur (Ready2Respond), it is critical that we leverage from the COVID-19 pandemic to reinforce investments, immunization programs' readiness and sustainability while enabling more country ownership by transferring more decision-making power to local organizations and systems.

The threat of vaccine hesitancy

Vaccine hesitancy persists on being a catastrophic public health issue globally, which can make all the discussed vaccine efforts futile. Vaccine hesitancy is significantly lower in developing countries compared to developed ones, as the general public has more trust towards institutions such as the WHO and the government. However, in the Western world the active use of social media continues to fuel the dissemination of misinformation and speculations [33]. Dr. K. Anand Kumar (Indian Immunologicals) emphasized that as adverse events may happen with vaccines, it is the responsibility of the government and manufacturer to restore confidence to the public by openly communicating test results and explanations.

Vaccine manufacturers should take collective action and play a role in providing scientific information to the public to increase confidence and knowledge of the benefits of vaccines, especially through social media and civil societies. As proposed by Dr. M. Makhoana (Biovac) vaccine advocacy should be through a positive lens to increase vaccine acceptance and has to be led by vaccine manufacturers, experts, and governments and as they speak and act in one voice [34]. To demonstrate the effectiveness of initiatives aiming to increase vaccine confidence through collaboration, Dr. Akira Homma (Bio-Manguinhos/Fiocruz) presented his project on improving vaccine uptake in Brazilian regions with the lowest coverage, by going into the field and working with the relevant local authorities. After more than a year, the project regions recovered to have the highest vaccine coverage. DCVMN can play significant role in helping DCVMs work collectively against vaccine hesitancy and share scientific information.

Conclusion

Sustainability and equity were the main topics of discussion throughout the 23rd DCVMN AGM. In terms of global equity and timely access, there were 4 parameters which were importantly identified: regional manufacturing and flexible supply chains, partnerships and synergies, financing and risk sharing, and lastly political will and export controls. Global equity and timely access depend on collaboration, cooperation, innovation and Africa. DCVMs do not have as large funding or capacities as large pharmaceutical companies from developed countries, therefore they must work complementarity with one another. Looking at the next steps, increasing South-to-South collaboration is vital, as underlined by Dr. Richard Hatchett (CEPI), and DCVMN plays an essential role in coordinating this. A rethinking of the DCVMs business models is also necessary to avoid them being priced down. DCVMs need to work together and share knowledge in order to succeed in the competitive global vaccine field. Umbrella associations such as DCVMN are the best opportunities to create the link and ensure the constant flow of communication between manufacturers, stakeholders, policymakers, international institutions, and funders.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Further reading

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