



WORLD HEALTH ORGANIZATION TOPIC BULLETIN

JOSH LERMAN
KATERINA KUTUZOV
CHAIRS

Contents:

Letters from the Chairs	3
Introduction	4
Topic A: Health Care in War Zones	5
Topic History	5
Current Situation	6
Country Policy	8
Questions to Consider	10
Topic B: Increasing Vaccine Coverage to Prevent Disease	
Outbreaks	10
Topic History	10
Current Situation	11
Country Policy	13
Questions to Consider	15
References	16



SECRETARIAT

SARAH MCILROY
SECRETARY GENERAL

ARIEL BARNEA
CHARGÉ D' AFFAIRES

ZHIZHEN ZHANG
DIRECTOR OF EXTERNAL AFFAIRS

JUSTIN OH
DIRECTOR OF EXTERNAL AFFAIRS

RAEHASH SHAH
DIRECTOR OF INTERNAL AFFAIRS

LUCAS KIM
DIRECTOR OF INTERNAL AFFAIRS

KRISHI DESAI
DIRECTORS OF OPERATIONS

ANNETTE KIM
DIRECTORS OF OPERATIONS

JASON PING
CHIEF OF STAFF

MARK KRAMER
FACULTY ADVISOR

SCOTT DEMETER
FACULTY ADVISOR

ANDREA BUCCINO
FACULTY ADVISOR

Academy Model United Nations

- THE TWENTY-FIRST ANNUAL CONFERENCE -

Dear Delegates,

My name is Joshua Lerman, and I am honored to be one of your co chairs. I am currently a junior here at Bergen County Academies. I started Model United Nations back in freshman year, but really got back into it sophomore year. After going to many conferences my love for MUN grew stronger and stronger. Throughout this conference I encourage you to be brave: talk, debate, and converse with your peers to come up with the perfect solutions! I want to encourage those who don't feel like saying much to speak as much as they can! (I've been there too!)

I have a personal connection to the World Health Organization since I am passionate about medicine, and can't wait for the intriguing and creative solutions you delegates devise for these issues!

Outside of school and MUN, I enjoy a variety of hobbies, including but not limited to: reading, playing soccer, hanging out with friends and family, and enjoying my video games (mainly Overwatch). I have to say I am very excited to meet all of you and cannot wait for an interesting and engaging conference! See you all soon!

Sincerely,
Joshua Lerman, Head-Chair, WHO
josler21@bergen.org

Hello everyone!

My name is Katerina Kutuzov and I'm incredibly happy to be your second co chair at AMUN XXI.

Although I've only recently gotten into Model UN, outside of school, I am an active participant in a variety of large scale community events that require a strong leadership role. This includes organizations like the Russian Heritage Foundation and the American Red Cross. I started doing Model UN in sophomore year, deciding to sign up for AMUN. Thanks to Model UN, I've become better at public speaking, can formulate my ideas concisely, and am now more aware of global news and events. I encourage each and every one of you to speak up and not be afraid; I took the chance and now am incredibly glad I did so.

I'm extremely excited to discuss these highly important and relevant topics with you. Remember, don't be afraid and take the chance! I promise you that won't regret it.

Best regards,
Katerina Kutuzov, Vice-Chair, WHO
katkut21@bergen.org



Introduction

The World Health Organization (WHO), is a specialized agency in the United Nations established in 1948 to improve global health conditions internationally. The First World Health Assembly met in Geneva and established their priorities for the organization as a whole: malaria, tuberculosis, venereal diseases, maternal and child health, sanitary engineering, and nutrition. The organization was also involved in disease prevention and control efforts, including mass campaigns against diseases like yaws, endemic syphilis, leprosy, and trachoma. WHO has been extremely successful with many of their activities; for instance, in 1958, the USSR proposed a WHO-led smallpox eradication programme, and by 1977, the last confirmed case of smallpox was identified in Somalia. WHO's programme has successfully eradicated the existence of smallpox by 1979.

WHO's responsibilities and functions include assisting governments in strengthening health services, establishing and

maintaining technical and administrative services (statistical services), promoting cooperation between scientific groups, stimulating eradication of diseases (through the improvement of nutrition, housing, sanitation, hygiene, and working conditions, proposing international conventions, developing international standards for food, biological, and pharmaceutical products, and developing public opinions among people regarding general health.

WHO's leadership priorities are currently aimed at the following six goals over the period of 2014-2019, according to Britannica:

1. Assisting countries that seek progress towards universal health coverage
2. Helping countries establish their capacity to adhere to the International Health Regulations
3. Increasing access to essential and high-quality medical products
4. Addressing the role of social, economic, and environmental factors in public health
5. Coordinating responses to noncommunicable diseases



6. Promoting public health and well-being in keeping with the Sustainable Development Goals, set forth by the UN.¹

Topic A: Health Care in War Zones

Topic History

Medicine in the battlefield dates way back to the first few civilizations in 4000-1500 BC. Countries were famous for having sophisticated medical training, like the Romans; however, the most casualties that emerged from wars that even the Romans couldn't overcome came from one deadly enemy: disease. This problem stays prevalent with centuries and centuries to come. With diseases ravaging through armies, doctors were left clueless on how to treat them. This gives way to a dip in the quality of military in the Middle Ages, where the doctors who treated one's wounds was whoever was nearest in the ongoing battle.

Fast forward to World War I, where soldiers' healthcare improved, despite the horrid circumstances. During this war, the world was introduced to trench warfare, along with this tactic came the most unsanitary places for soldiers to be cramped for months shooting at the other side. However, at this point, the immunization for tetanus was accessible (for select countries), anesthesia was available, and even IV! Radiography and other novel medical techniques also improved the healthcare quality of soldiers. Thus, deaths from wounds AND diseases drastically decreased. Additionally, to put in perspective, from around the American Civil War of 1861-65, mortality after amputations was 25%, while in WWI it was only 5%.² However, in 1918-19, an influenza epidemic claimed the lives of many soldiers, for disease prevention was not at all prepared for the strength of the flu. Additional advancements go as follows:

- 1916 Sidcup (UK): Hospital devoted to soldiers' facial injuries opens with 1,000 hospital beds.



- 1916 Allied Army: First successful storage of human blood on the battlefield.
- 1939 WWII: Mobile medical units were developed; deaths from disease dropped.
- 1953: A new limb-saving technique is developed, where blood vessels are able to be reconnected; the amputation rate in WWII was 50%, and it went down to about 5% in the Korean War.³
- 2003: New life-saving technologies were developed for operations in Afghanistan.

However, as medical technology progresses, so do diseases and military technologies. Current international conflicts are resulting in deathly conditions for not only soldiers but civilians as well, a problem that desperately needs to be addressed and resolved.

Current Situation

With many conflicts around the world, healthcare quality worsens for soldiers and civilians. To these ends, the IPI (International Peace Institute) and the Global Health Centre of the Graduate Institute took up this subject in a retreat in

Geneva on “Doctors in War Zones: International Policy and Health Care in Armed Conflict.” Dr. Hanna Kaade, co-founder of the German Global Surgery Association, described the shortcomings of working as a medical doctor first-hand in Aleppo, Syria. In the discussion, he talked about hardships ranging “from essential medical equipment being taken out of ambulances at checkpoints, to having to perform surgery under the light of a mobile phone after an electricity shut down.”⁴ Stepping aside the quality of treatments, the world needs to take a look at the issue of lack of equipment or lack of necessary preliminaries for efficient medical procedures. Kaade’s description is a microcosm of how medical practitioners in war zones are left with a paucity of materials necessary to perform certain procedures.

Relating back to another issue, Syria and Yemen are both currently engaged in violent civil wars of sorts, leaving many civilians dying of diseases. The conflict between these two countries has risen to a level of targeting healthcare facilities like hospitals,



public offices, and even camps purposely set up to treat sick children. Yemen is infested with Cholera, a disease the World Health Organization defines as “an acute diarrhoeal infection caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae*”. Cholera can be deadly after just a few hours if not treated.⁵ Despite this dreaded fact, Yemen currently has the world’s largest cholera outbreak: over 5,000 infections per day, over 200,000 total infected, and over 1,300 deaths (as of 2017).⁶ Not to mention, there have been outbreaks of measles and polio in Syria, and chemical weapons are being used: a breach of international law, and a breach on everyone’s health. With the aforementioned drawbacks of medical treatment that Dr. Hanna Kaade described, it can be seen how little is being done to help medical doctors in war zones.

Not too far away in Afghanistan and Iran, medical technology has met a terrible opponent. The ongoing U.S. - Afghanistan and Iran conflict has taken many lives on all sides. However, some on the Afghan and Iran side deploy a

unique, disturbing tactic in battles: suicide bombings. Besides the ethical issues this raises, Improvised Explosive Devices (IED’s) increased the amount of amputations and limbs lost altogether. Even with advanced technology, the U.S. troops, and other troops who face the same tactic that their enemy deploys, cannot compete with the explosive force on an IED.⁷

As stated before, a reason for the decline of healthcare quality is the lack of protection on medical facilities. According to GE2P2 Global, “In 2017, at least 188 hospitals and clinics were damaged or destroyed, 50 ambulances attacked or stolen, and there were 57 reports of armed groups violently assaulting staff and patients in hospitals—101 health-care workers were killed and 64 kidnapped, 203 patients were killed, and 141 injured. Denial or obstruction of access to health-care facilities was reported 74 times. 57 of these events were in the occupied Palestinian territory.” Thus, health facilities in countries all around the world, “including Afghanistan, Burkina Faso, the Central African



Republic, Egypt, and Turkey have been forced to close.”⁸

Taking all of this in, it is clear that healthcare in war zones has a lot to improve on. From ensuring accessibility of the wounded for medical doctors, to providing sufficient materials for efficient procedures, to protecting healthcare facilities, and finally, drawing a line when it comes to civilians.

Country Policy

Although this issue is undoubtedly both a serious and urgent matter, not much has progressed in terms of policy or mitigation. On the 28th of September, 2016, Mr. François Delattre, Permanent Representative of France to the United Nations, called upon countries that have not yet done so to ratify the Protocols Additional to the Geneva Conventions. In the 71st session of the Sixth Committee, all of the delegations underlined the importance of the full implementation of and respect for international humanitarian law (IHL). In addition, they recalled the importance of the Geneva

Conventions and the Protocols Additional thereto, stressing the need for those States that have not already done so to ratify the Protocols as well as to accede to other relevant instruments and to comply fully with their content.

The only truly significant course of action that has been carried out is Resolution 2286 that the UN Security Council unanimously adopted in May of 2016. Addressing the Council, then UN Secretary-General Ban Ki-moon, condemned military actions leading to destruction of health-care facilities as war crimes, and called on Member States to honour their obligations to protect health-care workers and patients in conflict saying “even war has rules”.⁸ However, it is clear that this resolution has had no legitimate long term success, with reported casualties only rising.

On the other hand, countries are working hard themselves to solve this issue on their own. The Russian Federation has what is called the Main Military Medical Directorate. Consisting of over 100,000 medical specialists, this medical group serves to preserve



and strengthen the health of military personnel, improve accessibility and quality of healthcare (all have the right to legislate on health care at the expense of the Russian Defense Ministry), and to upgrade the medical equipment of health centers of military units, the sanitary institutions and military hospitals. 11 Recently, Russia and Ukraine have fought over a region called Crimea, and only one can imagine the crisis going on in there. The French Defense Health Service covers medicine in the French military and is responsible for medical and sanitary support of the French military and of all institutions designated by the French Ministry of Defence. It excels in giving treatments to military personnel in the form of disease prevention, and medical, dental, pharmaceutical, paramedical and veterinary research and education. Although its presence resides mainly in France, the organizations aim is to improve the conditions of healthcare overseas as well. This ties France into this issue, where they already aim to protect

healthcare facilities.¹³ These are just two examples of how countries are handling themselves, but how can they, as well as every country in this committee, contribute to an international cause?

Countries like Syria, South Sudan, Yemen and Nigeria have embraced the help of the Red Cross. Their assistance includes deploying surgical teams in emergency situations and distributing vital drugs and medical technologies directly to war zones. In terms of political impact, the International Committee of the Red Cross (ICRC) has embarked on a major campaign to persuade governments and international organisations to work to protect healthcare in conflict situations and encourage respect for medical ethics.¹⁴ "The objective is to assure the security and delivery of effective and impartial healthcare in armed conflicts and other emergencies," said Robin Coupland, the ICRC's health adviser to the campaign. "This is not a new problem. We're becoming increasingly aware of it because of the modern kinds of conflict we are seeing in north Africa and the Middle East. Insurgents stop



ambulances and armed men go into hospitals in search of people. Healthcare becomes involved in the tactics."

Questions to Consider

How do we protect healthcare facilities from being targeted, guaranteeing better treatment?

Is it possible to make it so doctors can easily attend to any wounded soldier on the battlefield?

Where do we draw the lines when it comes to risking the health of civilians, intentional or not?

How will medical technology and techniques compete with new military tactics?

How should in compliance with Resolution 2286 be handled?

What does YOUR country do to ensure the safety of its soldiers, and how can it help with this growing international issue?

How do we guarantee the influx of medical personnel in W

Topic B: Increasing Vaccine Coverage to Prevent Disease Outbreaks

Topic History

Being one of the most vital and modern medical advancements, vaccines don't go a while back in history. The first successful vaccination is credited to Edward Jenner in 1796. The country doctor from Berkely, England used pus from a cowpox lesion on a milkmaid, and administered that pus to an 8 year old child. After being exposed to smallpox at two sites, the child seemed unaffected by the smallpox. 1 In other words, his body had defended against the cowpox, and this defense had made



the boy immune to small pox. By 1800, over 100,000 had been vaccinated in Europe, and vaccination had begun in the United States.

Fast forward to 1885, Louis Pasteur, a French chemist, discovers the vaccine for rabies. Prior to this novelty, the word “vaccine” only referred to smallpox, yet it started to become a general term for accessible immunizations to deadly diseases. Polio was added to the definition of “vaccine” in 1954, when Thomas Francis Jr. initiated trials for the polio vaccine.

1 The world overcame the first roadblock: discovering vaccines for different conditions (mumps, rubella, measles, etc.)² ; however, the second proved more difficult to overcome: making these vaccines accessible to the entire population of the world.

In the past, the World Health Organization has increased its efforts to better the world in terms of vaccinations. In the 1960’s-70’s the WHO forwarded a campaign for smallpox; this effort ultimately came to benefit the smallpox outbreak in Somalia in 1977. Additionally, the WHO launched

the Expanded Programme on Immunization (EPI) in 1974. The aim for this program was to drastically increase the vaccination rates of children and citizens in developing

countries. This program has been functioning for over three decades and has functioned through WHO’s regional offices to achieve target vaccination rates for every respective immunological agent.¹ However, in the present, inaccessibility to vaccines can prove dangerous, and possibly even fatal.

Current Situation

Immunization remains one of the most pressing issues in modern day public health. Many efforts have been put forth in order to improve this matter. In fact, according to gavi.org, “...in 2017, the number of children immunized – 116.2 million – was the highest ever reported. Since 2010, 113 countries have introduced new vaccines, and more than 20 million additional children have been [vaccinated]” ³ . However, many developing countries still do not have proper access to vaccines; moreover, low



coverage also leads to stalling or even potential detriment as time goes on. According to Dr Seth Berkley, CEO of Gavi, the Vaccine Alliance, “The extraordinary improvement in immunisation coverage made since 2000 is in danger of stalling, with conflict, human and animal migration, urbanisation and vaccine hesitancy adding new barriers to global vaccination efforts”. New WHO/UNICEF figures show that in 68 of the world’s poorest countries, while close to a million more children received the basic diphtheria-tetanus-pertussis vaccine in 2016 compared to 2015, the coverage rate has [stalled] at 80% for the past three years. Millions of children remain under-vaccinated in countries torn apart by conflict, from Syria to South Sudan”.⁴

These statistics are parallel in countries from all over the world. According to Africa Science News, “The WHO and UNICEF Estimates of National Immunisation Coverage 2016 (WUENIC 2016) figures show that 19.5

million infants globally did not receive all three doses of diphtheria-tetanus-pertussis

(DTP3) vaccine.” In 2015, DTP3 coverage in Liberia was just 52% (now, it has grown to 79%)⁴. Some of the most pressing issues can be found in the WHO Western Pacific Region, where there is only 23% coverage for the Haemophilus influenzae type b vaccine⁷. This causes various disease outbreaks, such as the current problem with polio in Nigeria, whose cases account for 80% of the worldwide total in mid-2003⁵. Overall data has proven that around 60% of the children who did not receive any vaccination live in any of these 10 countries: Angola, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Nigeria, Pakistan, the Philippines and Vietnam⁷. According to Frontiers in Public Health, “In African and Asian regions, infectious diseases are still the leading cause of death, especially in children <5 years of age. About 44.4% of children deaths in 2016 occurred in sub-Saharan Africa, and 24.8% in South Asia. Moreover, about half of the burden is contributed by diseases that seem to be almost exclusively reserved in Africa, such as malaria and invasive non-typhoidal



salmonella (iNTS), also referred to as diseases of poverty.”¹⁶

Vaccination has become a fairly controversial topic throughout the past years, in both first world and developing countries. Common themes revolve around the theories that vaccines are linked to health issues such as autism and prenatal infection. For example, in 2003, political and religious leaders in three Nigerian states boycotted a WHO polio vaccination campaign, claiming that the vaccine caused sterility and AIDS⁵. Similarly, certain Hindu and Muslim groups in India have long held the belief that vaccination is a covert method of family planning, primarily targeting Muslims⁶. Beliefs about the dangers of the ingredients contained in vaccines have spread as well. Thiomersal, “an antifungal preservative used in small amounts in some multi-dose vaccines,” contains mercury, was banned by the Centers for Disease Control (CDC)

and the American Academy of Pediatrics in 1999 after concern over it containing mercury arose, according to Good Times. They state, “Trace amounts remain in

some vaccines due to production processes, at an approximate maximum of 1 microgramme, around 15% of the average daily mercury intake in the US for adults and 2.5% of the daily level considered tolerable by the WHO.”

⁸ Overall, from celebrity endorsers to independent groups, the anti-vaccination movement has seen its fair share of supporters in the recent years.

Country Policy

Many countries have begun to rework their internal conflicts with vaccines. The United

States, for one, is currently in the works of enforcing vaccines nationally. In the first five months of 2019 only, the amount of measles cases reported surpassed the total cases per year for the past 25 years.

⁹ This came from a direct result of a decline in the number of children and adults receiving vaccines. Parents are capable of opting out of vaccines due to personal, ethical, and/or religious beliefs. However, some U.S. state governments recognized a larger scale issue with this, and enforce laws to attempt to



push further vaccination. For example, some states prohibited students from entering an educational facility without proper vaccinations, and some even instituted a fee for not vaccinating children. Although the United States has a plethora of vaccines, all of which are easily accessible, not enough children and adults are receiving them.

Countries in Europe have also taken a strict stance on vaccines, with about 35.4% having mandatory vaccines for at least one out of diphtheria, tetanus, pertussis, hepatitis B, poliovirus, Haemophilus influenzae type b, measles, mumps, rubella and varicella vaccine (as of 2018).¹⁰ However, the only two countries to have all of these mandatory are Italy and Latvia. Some countries, though, are only missing the mandatory Varicella vaccine, and those include: Poland, France, Czech Republic, Bulgaria, and Croatia.

Germany has recently started to push for mandatory vaccinations for all schoolchildren, similar to the U.S.; there is even a fine set in place for those who do not follow the new

bill. What prompted this sudden turn of emotions was the fact that out of the measles outbreak in 2018 up until February of 2019, Germany reported the most measles cases than any other country. "Whether in kindergarten, at the childminder or at school -- we want to protect all children against measles infection," Health Minister Jens Spahn said in a statement.¹¹

Significant progress has been made in regards to the situation in Africa. According to BBC, "In February in Addis Ababa, African health ministers signed a widely celebrated declaration of their commitment to keeping immunization at the forefront of efforts to save the continent's children from death and disease."¹² Titled the Addis Declaration on Immunization (ADI), representatives from 49 African countries agreed "...to ensure that everyone in Africa – regardless of who they are or where they live – receives the full benefits of immunization. It includes 10 commitments, including increasing vaccine-related funding, strengthening supply chains and delivery systems, and making



universal access to vaccines a cornerstone of health and development efforts,” according to Immunization in Africa 2016. 13 WHO has made immense contributions to the immunization crisis as well. For example, in 2017, they provided about 10 million deworming tablets and 6.3 million vitamin A tablets to areas such as Angola, Comoros, Madagascar, and Rwanda. In addition, nearly 7.7 million children were screened for malnutrition, and overall, nearly 14 million doses of vaccines were administered in 19 countries. 14 Efforts to improve immunization have made their mark in Asia as well. In March of 2014, the Southeast Asian region was certified polio-free by the WHO and has stayed this way since then. In addition, in 2016, the region was validated to have eliminated maternal and neonatal tetanus. Moreover, region-wide progress towards measles elimination and rubella/congenital rubella syndrome control has been steadfast, with Bhutan and the Maldives already free of indigenous measles. Notably, increased coverage of the diphtheria pertussis

tetanus vaccine from 82% in 2000 to 88% in 2016 has resulted in a substantial drop in associated disease burdens. 15 National routine immunization coverage data show that six countries (Bangladesh, Bhutan, Democratic People’s Republic of Korea, Maldives, Sri Lanka, Thailand) have achieved and sustained $\geq 90\%$ DTP3 coverage since 2012.1 5 These improving statistics were due to the efforts of The South-East Asia Regional Vaccine Action Plan (SEARVAP), having been developed in line with World Health Assembly-approved Global Vaccine Action Plan. By enhancing service delivery of vaccination technology, this organization has continued to improve the situation in this region.

Questions to Consider

What is your country’s policy on vaccines, and how does it relate to the wellbeing of the world?

How do we increase accessibility of vaccines to underdeveloped areas?



How do we go about addressing the resistance of vaccination?

To what extent are countries to allow people to opt out of vaccinations based on personal beliefs?

What can be done about recent measles outbreaks to ensure no repetition?

References

Topic A

1. <https://docs.google.com/document/d/137p5MVV27QqfIC4SXAKU3icxyk9VHdVbs6lNTxJfsg8/edit?usp=sharing>

2. <https://www.worldwar1centennial.org/index.php/practice-of-medicine-in-ww1.html>

3. <https://www.history.com/news/world-war-i-plastic-surgery-innovations-gillies>

4. <https://www.ipinst.org/2018/06/doctors-in-war-zones#4>

5. <https://www.who.int/news-room/fact-sheets/detail/cholera>

6. <https://www.statnews.com/2017/07/07/syria-yemen-cholera-polio-war/>

7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2706344/>

8. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)31120-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)31120-6/fulltext)

9. <https://onu.delegfrance.org/Preventing-access-to-health-care-is-increasingly-used-by-the-parties-to-the>

10. <https://www.un.org/en/ga/sixth/71/protocols.shtml>

11. http://eng.mil.ru/en/structure/ministry_of_defence/details.htm?id=9586@egOrganization

12. <https://www.icrc.org/en/support-us/operation/war-surgery>



13. <https://www.defense.gouv.fr/sante/le-ssa/la-directrice-centrale/biographie-de-la-directrice-centrale> (site is in French, translated to English)

14. <https://www.theguardian.com/society/2012/apr/22/red-cross-doctors-war-zones>

Topic B

1. <https://www.healthaffairs.org/doi/full/10.1377/hlthaff.24.3.611>

2. <https://www.cdc.gov/vaccines/vpd/vaccines-list.html>

3. https://www.who.int/immunization/global_vaccine_action_plan/en/

4. <https://www.gavi.org/library/news/statements/2017/vaccine-progress-in-developing-countries-in-danger-of-stalling/>

5. <https://journals.plos.org/plosmedicine/article?id=10.1371/>

[journal.pmed.0040073](https://doi.org/10.1371/journal.pmed.0040073)

6. <https://www.sciencedirect.com/science/article/abs/pii/S0277953695000345?via%3Dihub>

7. <https://www.who.int/news-room/fact-sheets/detail/immunization-coverage>

8. <https://www.fda.gov/vaccines-blood-biologics/safety-availability-biologics/thimerosal-and-vaccines>

9. <https://www.cdc.gov/media/releases/2019/p0530-us-measles-2019.html>

10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6001041/>

11. <https://www.cnn.com/2019/07/17/health/germany-measles-mandatory-vaccine-sci-intl/index.html>

12. <https://www.weforum.org/agenda/2016/05/immunization-in-africa-a-story-of-hope-and-progress-but-also-challenges>



13. <https://www.weforum.org/agenda/2016/05/immunization-in-africa-a-story-of-hope-and-progress-but-also-challenges>

14. <https://www.afro.who.int/health-topics/immunization-and-vaccines-development/african-vaccination-week>

15. http://www.searo.who.int/indonesia/topics/immunization/south_east_asia_regional_vaccine_action_plan_2016_2020.pdf

16. <https://www.frontiersin.org/articles/10.3389/fpubh.2019.00056/full>

