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EBOLA DISEASE' COULD BE 20 TIMES DEADLIER THAN COVID-19

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ABSTRACT:

Ebola contagion complaint(EVD) is a severe and constantly murderous complaint caused by Ebola contagion(EBOV). EVD outbreaks generally start from a single case of probable zoonotic transmission, followed by mortal- to- mortal transmission via direct contact or contact with infected fleshly fluids or defiled diminutives, Ebola Virus Disease (EVD) exhibits a high rate of cases resulting in casualties, displaying symptoms such as fever, gastrointestinal manifestations, and a pattern of dysfunction across multiple organs opinion requires a combination of case description and laboratory tests, generally real- time rear recap PCR to descry viral RNA or rapid-fire individual tests grounded on immuno- assays to descry EBOV antigens. Recent advances in medical countermeasure exploration redounded in the recent blessing of an EBOV-targeted vaccine by European and US nonsupervisoryagencies.The technologically advanced vaccines like a viral- vectored vaccine, DNA vaccine and contagion- suchlike patches are underway for testing against EBOV. In the absence of any effective control measure, the adaption of high norms of bio-security measures, strict aseptic and aseptic practices, strengthening of surveillance and monitoring systems, assessing applicable counter-blockade checks and alert on trade, transport, and movement of callers from EVD aboriginal countries remains the answer of choice for diving the EBOV spread. In this discussion, we focus on the current script of Ebola virus (EBOV), with particular attention to animal and veterinary viewpoints, as well as advancements in approaches to prevention and control strategies that should be adopted. learned from the recent outbreaks and the global preparedness-plans.The results of a randomized clinical trial of Investigational rectifiers for EVD demonstrated survival benefits from two monoclonal antibody products targeting the EBOV membrane glycoprotein. New compliance arising from the unknown 2013 – 2016 Western African EVD outbreak(the largest in history) and the ongoing EVD outbreak in the Democratic Republic of the Congo have mainly bettered the understanding of EVD and viral continuity in survivors of EVD, performing in new strategies toward forestalment of infection and optimization of clinical operation, acute illness issues and attendance to the clinical care requirements of cases.

KEY WORDS : Ebola virus ,Deadly ,COVID-19 ,Comparative mortality ,Public health threat , Epidemiology , Outbreaks ,Transmission ,Mortality rate ,Containment ,Vaccine development ,Global health emergency Healthcare infrastructure , Pandemic preparedness , Zoonotic transmission , High-risk populations , Personal protective equipment (PPE) , Quarantine measures.

INTRODUCTION:

To date, 12 distinct filo- contagions have been described1. The seven filo- contagions that have been set up in humans belong moreover to the genus Ebola- contagion(Bundibugyo contagion(BDBV), Ebola contagion(EBOV), Res- ton contagion(RESTV), Sudan contagion(SUDV) and Taï Forest contagion(TAFV);Fig. 1) or to the rubric Marburgvirus(Mar- burg contagion(MARV) and Ravn contagion(RAVV)) 2. The WHO International Bracket of conditions Revision 11(ICD- 11) of 2018 recognizes two major subcategories of filo- contagion complaint(FVD) Ebola complaint caused by BDBV, EBOV, SUDV or TAFV, and Mar- burg complaint caused by MARV or RAVV. Ebola contagion complaint(EVD) is defined as a complaint only caused by EBOV. This sub-categorization of FVD is largely grounded on the adding substantiation of molecular differences between ebolaviruses and marburgviruses, differences that may impact contagion – host force tropism, pathogenesis and complaint phenotype in accidental primate hosts2. The implicit graveness of the Ebola complaint, suggested to be 20 times deadlier than COVID- 19, underscores the critical need for a thorough examination of its characteristics, transmission dynamics, and impact on public health. This assertion prompts a closer disquisition of the relative pitfalls posed by these two redoubtable contagions.

Ebola, earlier nominated as Ebola haemorrhagic fever(EHF), is a critically murderous complaint which primarily affects the humans and inhuman primates. Ebola contagion complaint(EVD) occurs due to a contagion infection which belongs to the family Filoviridae and genus Ebolaviruses has posed individual challenges and has been a universal public health trouble since its discovery. While probing an alleged unheroic fever case,Dr. Peter Piot in the time 1976 first detected the complaint in Zaire, Africa(presently the Democratic Republic of Congo). The name " Ebola " was nominated as the complaint was noticed near the Ebola swash in Congo.

Ebola contagion transmission primarily takes place through close fleshly contact with the infected case or their fluids, defiled towel shells, and apparel from alive, infected or departed individualities. Unsafe traditional burial practices also play a vital part in the complaint transmission.(6) There's proved substantiation regarding the sexual mode of complaint transmission, although transmission through the air is doubtful.

TAXONOMY Of EBOLA DISEASE:

Taxonomy of the genus Ebola- contagion , So far, five types of ebolaviruses have been connected to fatal infections, with four identified as pathogens. B| The natural force host(s) of Ebola contagion(EBOV) has(have) yet to be linked. Multiple data indicate a direct or circular part of batons in EBOV ecology, but to date, EBOV has not been insulated from, nor has a near-complete EBOV genome been detected in any wild animal279. still, it's tempting to presume that Ebola contagion complaint(EVD) is a zoonosis(that is, an contagious complaint caused by an agent transmitted between creatures and humans) because retrospective epidemiological examinations have frequently been suitable to track down the probable indicator cases of EVD outbreaks. These individualities had been in contact with wild creatures or had handled the corpse of a possible accidental EBOV host 7,280. C Scanning electron bitsy(SEM) image of EBOV patches(green) expiring from grivet cells. D| Transmission electron bitsy(TEM) image of EBOV patches(green) expiring from grivet cells 1,281.

The area name has received approval from the International Committee on Taxonomy of Contagions (ICTV), but it is pending ratification. Corridors C and D are provided by J. Wada and J. Bernbaum, from the NIH/NIAID Integrated Research Facility at Fort Detrick, Frederick, MD, USA.

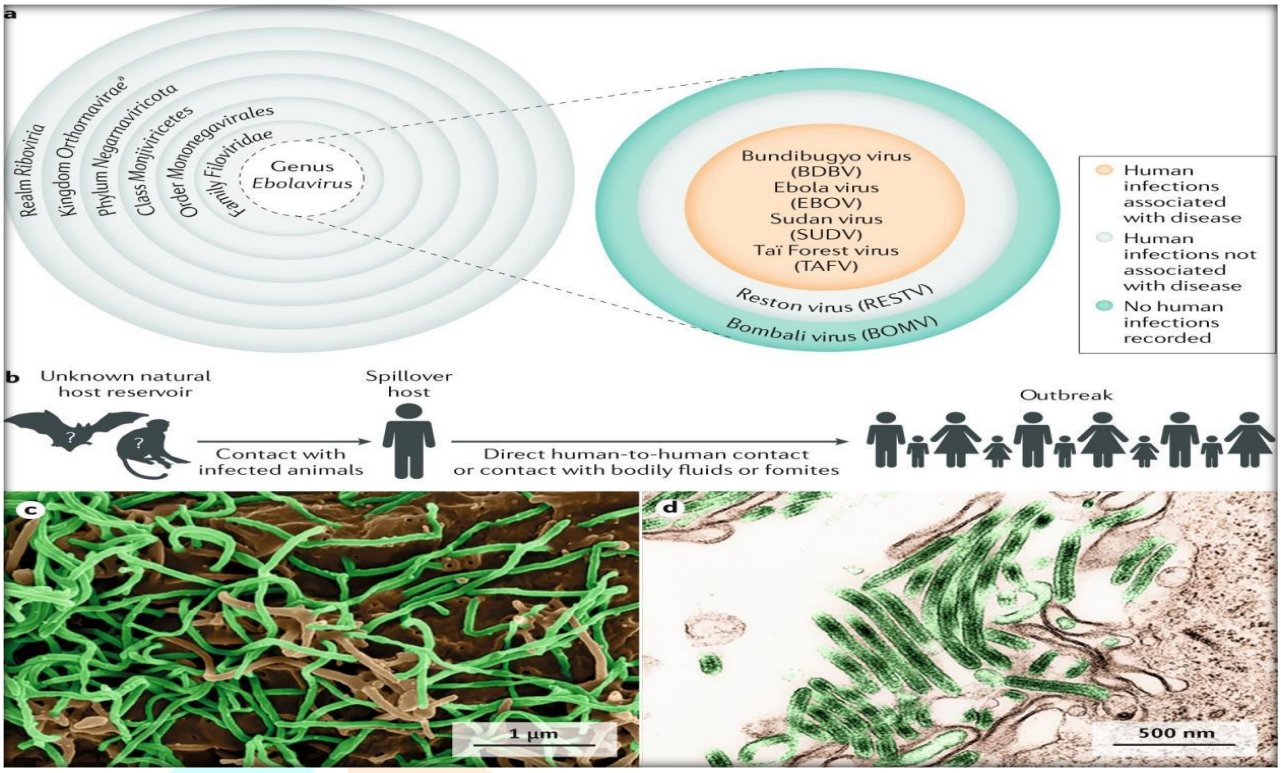

fig:01 (taxonomy of ebola disease)

Since the discovery of filo- contagions in 1967(ref.3), 43 FVD outbreaks(banning at least five laboratory-acquired infections) have been recorded in or exported from Africa4. The epidemiological description of outbreak is one or further cases above the known aboriginal frequency, For example, the solitary instance of TAFV infection documented in a location where FVD had not been previously reported (Côte d'Ivoire) is still regarded as an outbreak. All FVD outbreaks, excluding those induced by TAFV, were marked by exceptionally high case fatality rates (CFRs), also known as lethality.

Until 2013, the most expansive outbreak, caused by SUDV, involved 425 cases and 224 deaths(CFR52.7) 6. The overall limited figures of FVD cases(1967 – 2013 2,886 cases including 1,982 deaths4), the typical remote and pastoral locales of outbreaks and the frequently delayed advertisement of new outbreaks to the transnational community7 have averted the methodical study of clinical FVD in humans. therefore, the generally used description of FVD was deduced either from observation of small groups of cases in care settings that weren't well- equipped for opinion, treatment and complaint characterization, or from compliance of indeed lower samples, similar as individualities who were transferred from Equatorial Africa to Europe and the USA or who fell sick in Europe or the USA after contracting the contagion away. Pathological characterization of FVD via necropsies has been rare 7,8. In the absence of expansive mortal clinical data, FVD could only be defined further via the use of experimental beast infections 9,10.

STRUCTURE OF E. VIRUS :

The E. virus exhibits a filamentous morphology, measuring 800 nm in length and 80 nm in diameter, and contains a single-stranded negative-sense RNA enclosed within an envelope [9]. There are seven expressed proteins by Ebola:

Nucleoprotein (NP), glycoprotein (GP), RNA-dependent RNA Polymerase (L), and four structural viral proteins: (VP24), (VP30), (VP35), and (VP40) .

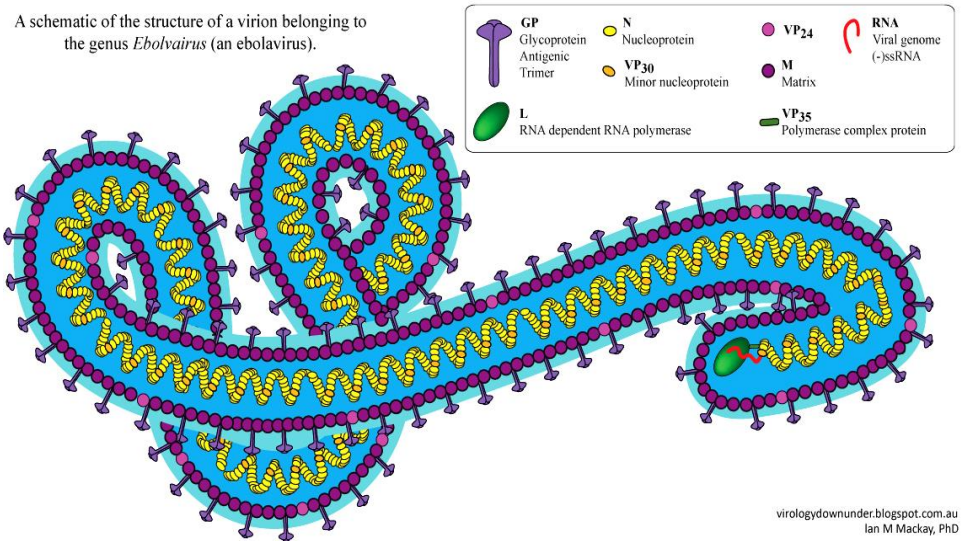

fig:02 (schematic structure ebolavirus)

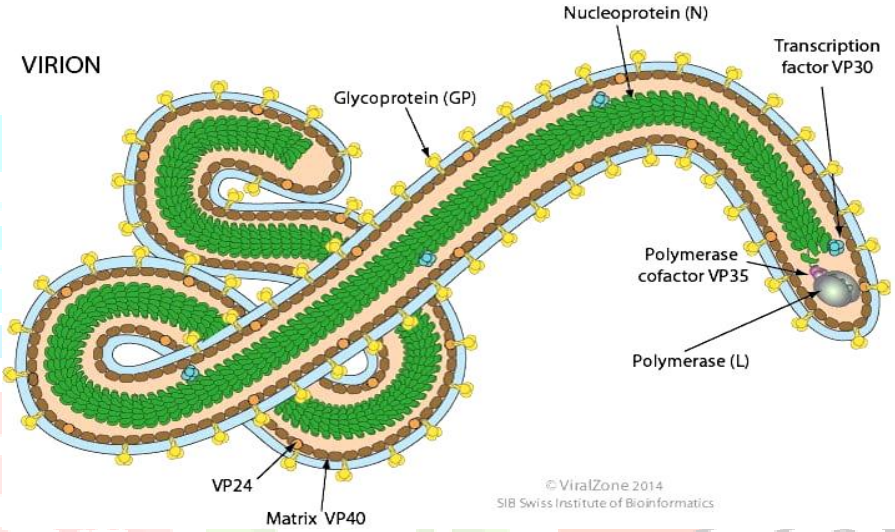

fig:03 (structure of ebolavirus)

THE FUNCTION OF THESE PROTEINS IS SUMMARIZED AS FOLLOWS:

- NP: Essential for RNA encapsulation
- GP: GP is crucial for attaching the virus to the host cell membrane and facilitating the entry of the virus's nucleocapsid into the host cytoplasm.
- VP24: It plays a vital role in virus assembly and transcription by being a component of the nucleocapsid structure.
- VP30: Suppression of viral RNA silencing
- VP35: Binds to NP to remove the nucleocapsid to facilitate the Transcriptional expression
- VP40: Necessary for positioning the virus outside the host cell membrane, this protein, along with GP, contributes to giving the virus its filamentous shape and aids in preserving the structural integrity of the virion.

TRANSMISSION OF EBOLAVIRUS DISEASE:

Scientists suppose people are originally infected with an ebolavirus through contact with an infected beast, similar as a fruit club or inhuman primate. This is called a spillover event. After that, the contagion spreads from person to person, potentially affecting numerous people.

Ebolaviruses spread through contact(similar as through broken skin or mucous membranes in the eyes, nose, or mouth) with fig04(transmission of ebolavirus) Blood or body fluids(urine, slaver, sweat, feces, heave, bone milk, amniotic fluid, and semen) of a person who's sick with or has failed from Ebola complaint. Objects(similar as clothes, coverlet, needles, and medical outfit) defiled with body fluids from a person who's sick with or has failed from Ebola complaint. Infected fruit batons or inhuman primates(similar as hams and monkeys). Semen from a man who recovered from Ebola complaint(through oral, vaginal, or anal coitus). Ebolaviruses can remain in certain body fluids(including semen) of a case who has recovered from Ebola complaint, indeed if they no longer have symptoms of severe illness. There's no substantiation that ebolaviruses can spread through coitus or other contact with vaginal fluids from a woman who has had Ebola complaint, When individuals contract an ebolavirus infection, they do not immediately begin to show signs or symptoms.

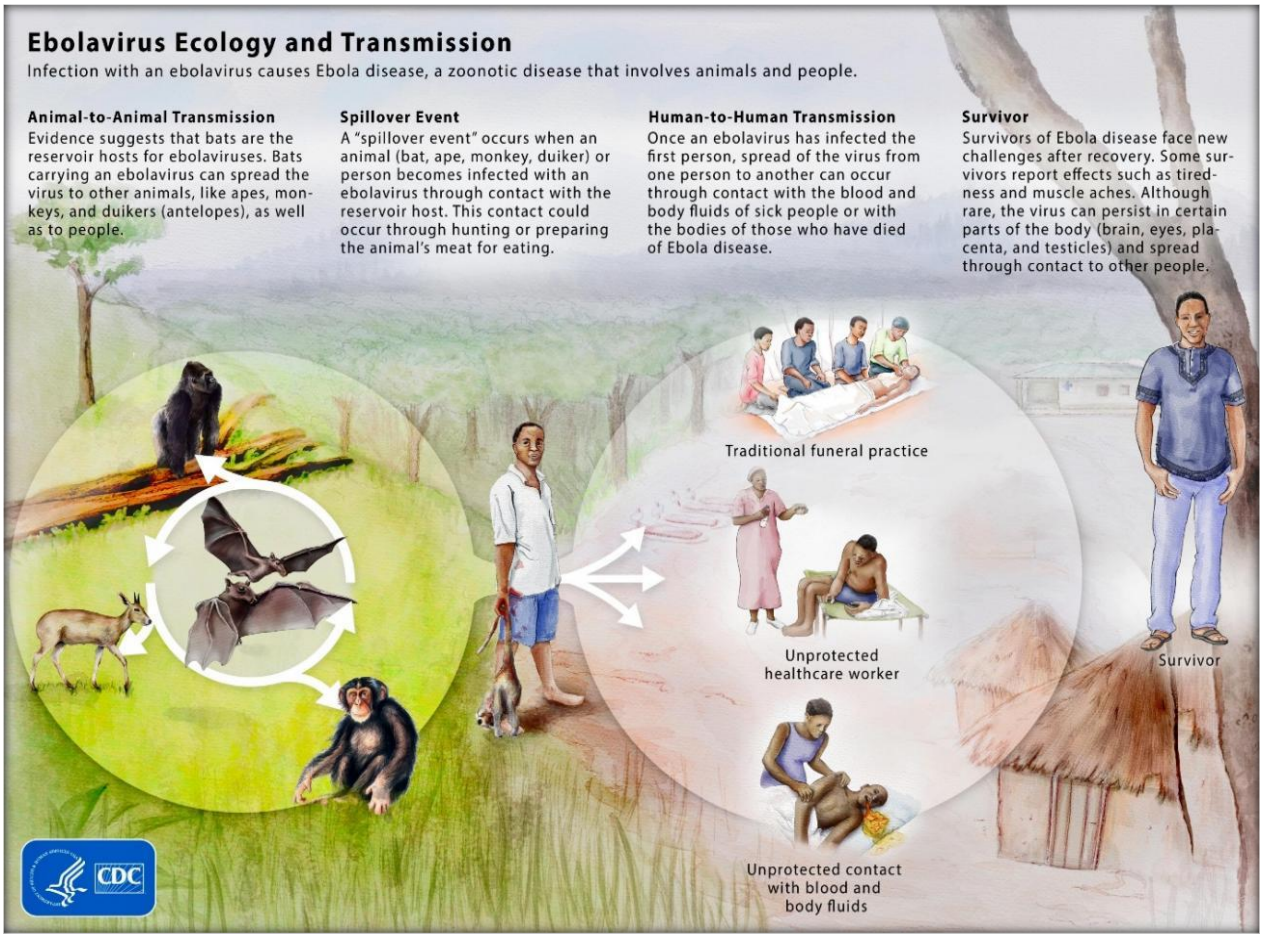

fig:04 (transmission of ebolavirus)

The time span between exposure to an illness and the onset of symptoms is referred to as the incubation period. A person can only broadcast an ebolavirus to other people after they develop gesticulations and symptoms of Ebola complaint . also, ebolaviruses aren't known to be transmitted through food. still, in certain corridor of the world, ebolaviruses may spread through the running and consumption of wild beast meat or hunted wild creatures infected with an ebolavirus. There's no substantiation that mosquitoes or other insects can transmit ebolaviruses.

SIGNS AND SYMPTOMS:

Symptoms can manifest between 2 to 21 days following exposure to an ebolavirus, typically averaging 8 to 10 days. The illness typically evolves from initial "dry" symptoms such as fever, aches, pains, and fatigue, to more severe "wet" symptoms including diarrhea and vomiting as the condition worsens.

Primary Signs and symptoms of ebola complaint frequently include some or several of the following ;

- Fever Pangs and Pains.
- Similar as Severe Headache.
- Muscle and Joint Pain Weakness.
- Fatigue Sore Throat Loss of Appetite.

Gastrointestinal symptoms including :

- Abdominal Pain & Diarrhea.
- Puking Unexplained Hemorrhaging.
- Bleeding or Bruising.

Other symptoms may include :

- Red Eyes.
- Skin Rash.
- Interruptions.

Numerous common ails can have the same symptoms as ebola complaint, including influenza(flu), malaria, or typhoid fever.

Ebola complaint is a rare and frequently deadly illness. Recovery depends on good prerogative clinical care and the case's vulnerable response. Studies show that survivors of an ebolavirus infection have antibodies(proteins made by the vulnerable system that identify and neutralize overrunning contagions) that can be detected in the blood up to 10 times after recovery. Survivors are allowed
to have some defensive impunity to the species of ebolavirus that repulsed them.

OUTBREAKS: EBOLA VIRUS DISEASE

Between late 2013 and early 2016, EBOV initiated outbreaks that predominantly originated from Middle Africa, including the Democratic Republic of the Congo, Gabon, and the Republic of the Congo the most extensive outbreak on record, originating in Guinea and spreading to other nations in West Africa. This outbreak resulted in 28,652 fatal infections and 11,325 deaths. The position and scale of the 2013 – 2016 outbreak was entirely unexpected12. Accordingly, original, public and transnational associations were caught unrehearsed for an outbreak caused by what, until also, was considered an fantastic pathogen of largely negligible consequence for global public health. After the WHO declared the outbreak a Public Health Emergency of International Concern, the global and original responses to the outbreak boosted. Ultimately, the outbreak was brought under control, yet it caused widespread devastation to individuals, families, communities, healthcare systems, and economies, In utmost affected countries, the response included the establishment of Ebola(contagion complaint) Treatment Units(ETUs), in which medical professionals and biomedical scientists managed large cohorts of cases with suspected or verified EVD in controlled settings.

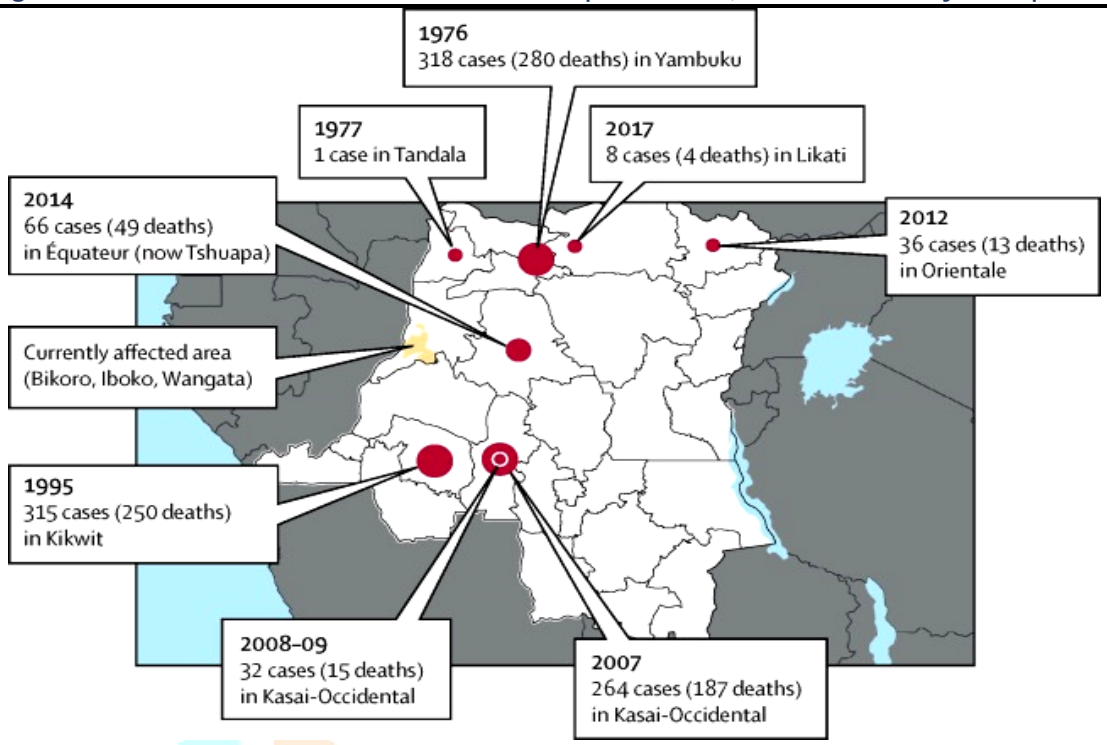

fig: 05 (ebola virus disease outbreaks : from: ebola vvirus disease)

From this experience, scientists were suitable to more understand a contagion preliminarily best known as a implicit bioweapons agent 20,21. Besides the outbreak in West Africa, there is currently an ongoing outbreak in the Ituri, Nord-Kivu, and Sud-Kivu regions of the Democratic Republic of the Congo, constituting the second outbreak.

largest outbreak in terms of the number of cases and deaths, with 3,418 infections and 2240 deaths(as of 28 January 2020) 22(Fig. 05). The chart shows the position and times of all reported Ebola contagion complaint(EVD) outbreaks. Two cases of laboratory- acquired EVD passed in Russia(not shown). Acclimated with authorization of McGraw- Hill Education, from Harrison's principles of internal drug, Jameson. et al,vol. 2, 20th edn, 2018(ref.282).

EBOLA OUTBREAK: IN CURENT ;

September 2022 Uganda, Mubende District,

Uganda's Ministry of Health announced the end of the Ebola outbreak (Sudan strain) that originated in Mubende District and spread to other parts of the country on January 11, 2023. On September 20, 2022, the Ministry of Health in Uganda confirmed an Ebola outbreak (Sudan strain) in Mubende District, located in western Uganda, following the isolation of a suspected case of viral hemorrhagic fever at Mubende Regional Referral Hospital. A sample from the case was sent to the VHF laboratory at the Uganda Virus Research Institute, where Ebola (Sudan strain) was confirmed. This event marked the sixth Ebola outbreak in Uganda, with five out of the six caused by the Sudan ebolavirus species.

The outbreak spread to nine sections In Uganda(Mubende, Kyegegwa, Kassanda, Kagadi, Bunyangabu, Kampala, Wakiso, Masaka City, Jinja). Rapid Response armies were posted to support outbreak response exertion, including disquisition of unexplained deaths and contact dogging.

Uganda Ebola Outbreak 2022 / Affected Areas (Data as of January 4, 2023)

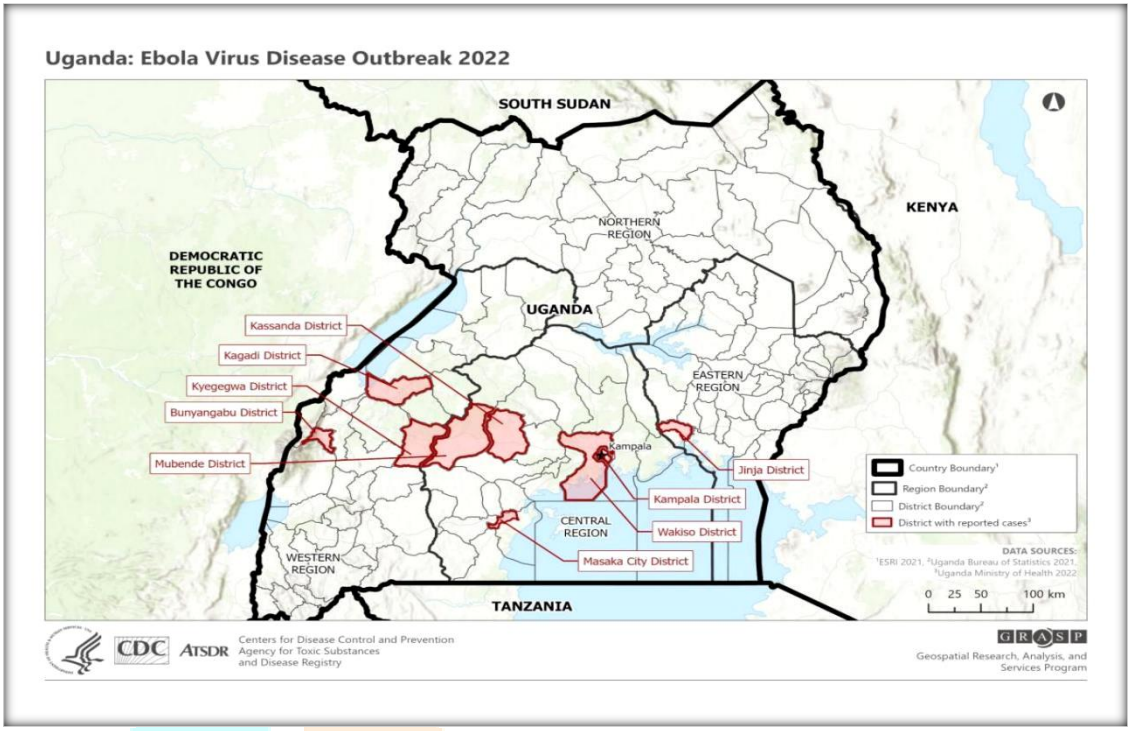

fig:06 (map showing the uganda evd outbreak from 9-20-22 in the kyegegwa and mubende districts)

Last Reviewed: January 27, 2023

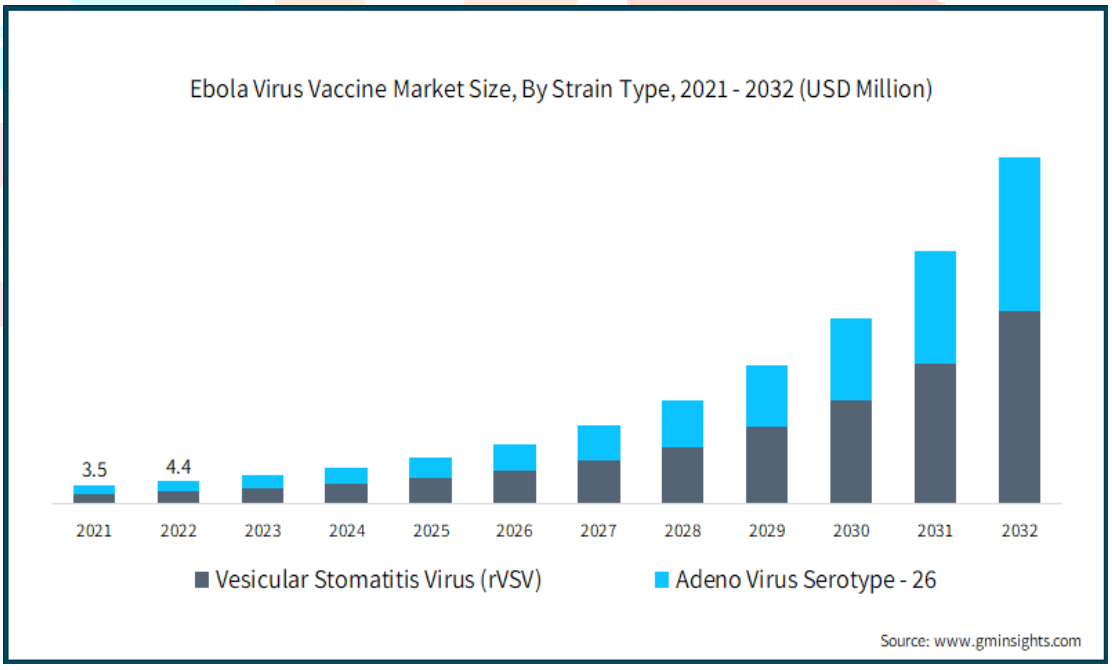

fig:07 (ebola virus vaccine market size)

PREVENTION AND VACCINE:

In regions where Ebola cases are frequent, it is believed that ebolaviruses spread at low rates among specific animal populations.

Ebolaviruses can spread to a person when they come in contact with an infected beast. Once infected, a person can come sick with Ebola complaint and spread the contagion to other people who come in contact with them. When living in or traveling to a region where ebolaviruses are potentially present, there are several ways to cover yourself and help the spread of Ebola complaint. Avoid contact with blood and body fluids(analogous as urine, feces, saliva, sweat, heave, bone milk, amniotic fluid, semen, and vaginal fluids) of people who are sick.

- Avoid contact with semen from a man who has recovered from Ebola complaint, until testing shows that the contagion is gone from his semen.
- Avoid contact with particulars that may have come in contact with an infected person's blood or body fluids(analogous as clothes, counterpane, needles, and medical outfit).
- Refrain from participating in burial rituals or practices that involve direct contact with the body of an individual suspected or confirmed to have had Ebola.
- Avoid contact with bludgeons, timber antelopes, inhuman primates(analogous as monkeys and chimpanzees), and the blood, fluids, or raw meat prepared from these or unknown brutes.

The same preventive measures should be employed when residing in or traveling to an area impacted by an Ebola outbreak. After returning from an Ebola- affected area, people should cover their health for 21 days and seek medical care directly if they develop symptoms of Ebola complaint.

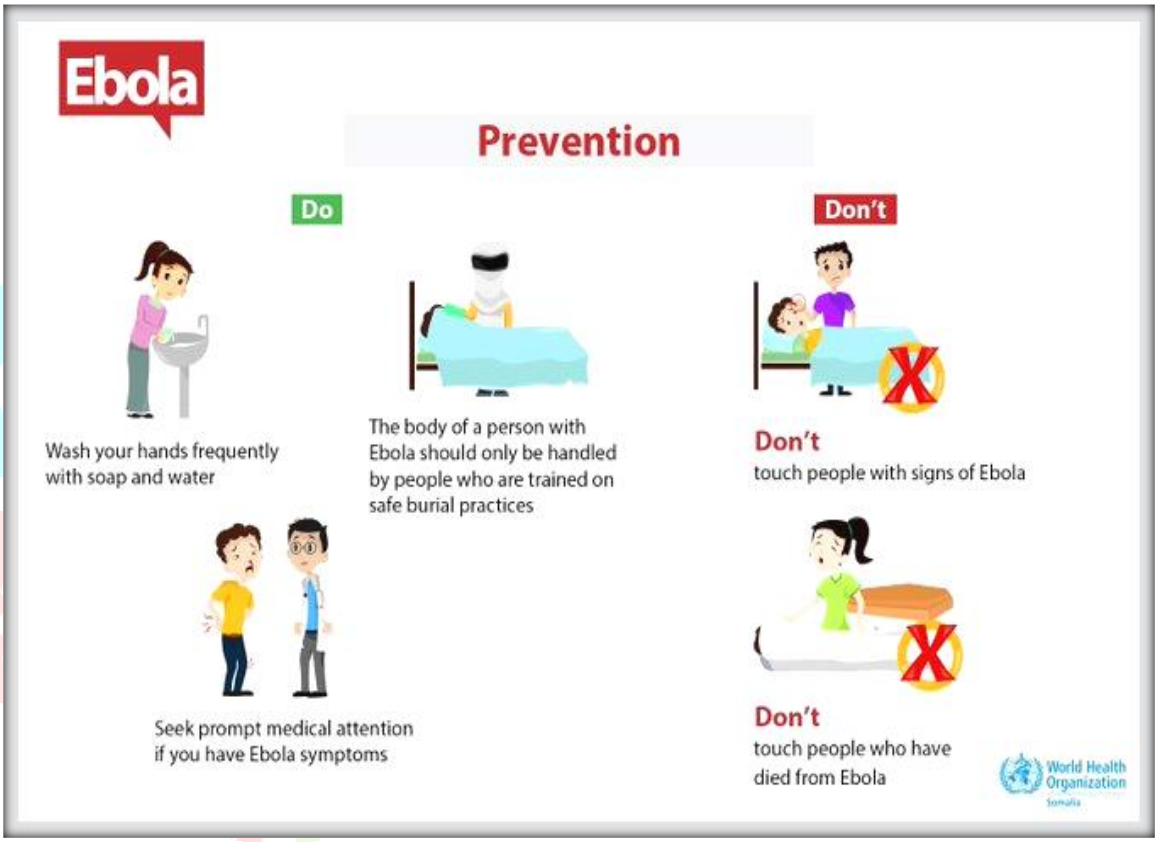

fig:08 (prevention & control)

DIAGNOSIS :

Diagnosing Ebola complaint shortly after infection can be delicate. Early symptoms of Ebola complaint similar as fever, headache, and weakness aren't specific to infection with ebolaviruses and frequently are seen in cases with other more common conditions, like malaria and typhoid fever. To determine whether Ebola complaint is a possible opinion, there must be a combination of symptoms suggestive of Ebola complaint AND a possible exposure to an ebolavirus within 21 days before the onset of symptoms. An exposure may include contact with Blood or body fluids from a person sick with or who failed from Ebola complaint, Objects defiled with blood or body fluids of a person sick with or who failed from Ebola complaint, Infected fruit batons and inhuman primates(hams or monkeys), or Semen from a man who has recovered from Ebola complaint. still, he or she should be insulated(separated from other people) and public health authorities notified, If a person shows signs of Ebola complaint and has had a possible exposure.

- Blood samples from the case should be collected and tested to confirm infection. Ebolaviruses can be identified in the bloodstream following the appearance of symptoms. It may take up to three days after symptoms start for the contagion to reach sensible situations.
- Polymerase chain response(PCR) is a generally used individual system for Ebola complaint because of its capability to descry low situations of an ebolavirus. PCR styles can descry the presence of a many contagion patches in small quantities of blood, but the capability to descry the contagion increases as the quantum of contagion increases during an active infection. When the contagion is no longer present in great enough figures in a case's blood, PCR styles will no longer be effective.

The discovery of antibodies is another system used to confirm a person's exposure to and infection by an ebolavirus.

A positive laboratory test means that an ebolavirus infection is verified. Public health authorities will conduct a public health disquisition, including relating and covering all potentially exposed connections.

TREATMENT:

THERAPEUTICS:

There are presently two treatments * approved by the U.S. Food and Drug Administration(FDA) to treat EVD caused by the Ebola contagion, species Zaire ebolavirus, in grown-ups and children. In October 2020, the initial medication approved, Inmazeb™, comprises a blend of three monoclonal antibodies. Ebanga™, an alternative treatment consisting of a single monoclonal antibody, received approval in December 2020. Monoclonal antibodies(frequently shortened as mAbs) are proteins produced in a lab or other manufacturing installation that act like natural antibodies to stop a origin similar as a contagion Preventing replication after infecting an individual.

These specific monoclonal antibodies (mAbs) target a segment of the Ebola virus's surface known as the glycoprotein, preventing the virus from entering human cells. During the Ebola outbreak in the Democratic Republic of the Congo from 2018 to 2020, these treatments, along with two additional ones, were assessed through a randomized controlled trial. Overall, survival rates significantly improved for individuals receiving either of the two treatments now approved by the FDA. However, neither Inmazeb™ nor Ebanga™ has been assessed for efficacy against Ebola virus species other than Zaire ebolavirus.

SUPPORTIVE CARE:

Regardless of the availability of alternative treatments, early provision of basic interventions can greatly enhance the likelihood of survival. These interventions, known as supportive care, encompass:

- Furnishing fluids and electrolytes(body mariners) orally or through infusion into the tone(intravenously).
- Administering medication to maintain blood pressure, alleviate vomiting and diarrhea, and manage fever and pain.
- Treating other infections, if they occur.

DISCLAIMER:

The inclusion of product names or non-governmental entities on CDC Ebola websites does not imply official endorsement by the CDC, the Department of Health and Human Services, or the United States Government.

EBOLA VACCINE:

The Ebola vaccine rVSV-ZEBOV (known as Ervebo®) received approval from the U.S. Food and Drug Administration (FDA) on December 19, 2019. Administered as a single dose, this vaccine has demonstrated safety and efficacy specifically against the Zaire ebolavirus species, responsible for the most significant and lethal Ebola outbreaks. Notably, it is the first FDA-approved vaccine for any ebolavirus. On February 26, 2020, the Advisory Committee on Immunization Practices (ACIP) recommended pre-exposure prophylaxis

vaccination with rVSV-ZEBOV for adults aged 18 and above in the U.S. who face potential occupational exposure to Zaire ebolavirus. This recommendation includes adults who are,

- Individuals involved in responding to or preparing for an outbreak attributable to the Ebola virus;
- Laboratory personnel or other staff members operating within biosafety-level 4 facilities in the United States, engaged in handling live Ebola virus.
- Healthcare personnel working at federally Ebola Treatment Centers.In the United States.

Healthcare providers seeking details regarding the Ebola vaccine and the vaccination of groups recommended by the Advisory Committee on Immunization Practices (ACIP).

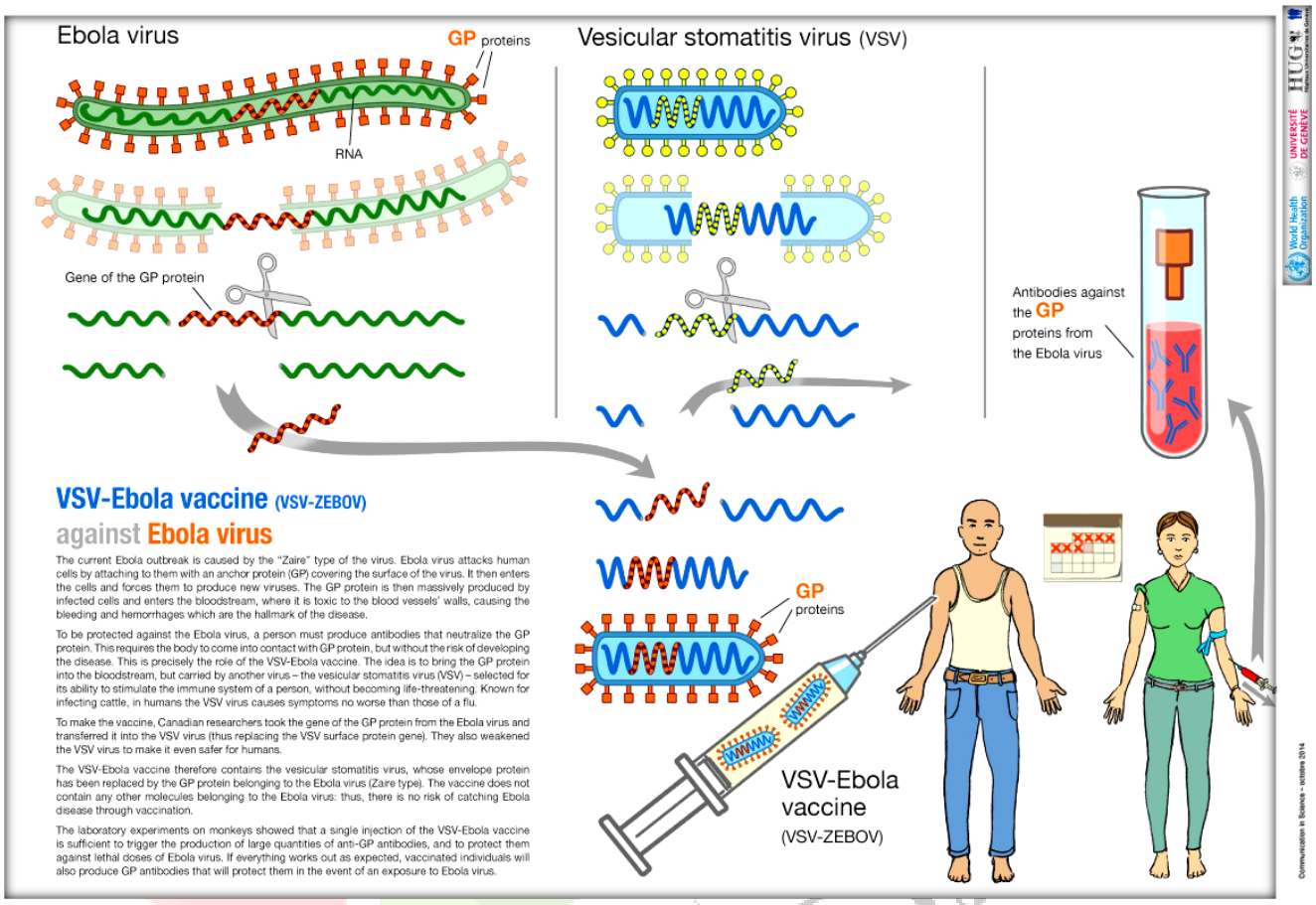

fig:09 (ebola vaccine)

During an Ebola outbreak in the Democratic Republic of the Congo in 2019, a two-dose vaccine regimen of another vaccine, designed to protect against the Zaire ebolavirus species, was administered under a research protocol. This vaccine utilizes two different components (Ad26.ZEBOV and MVA-BN-Filo) and necessitates an initial dose followed by a "booster" dose 56 days later. However, the FDA has not yet approved this vaccine for regular use.

EBOLA VACCINE: INFORMATION ABOUT ERVEBO:

- **THE EBOLA VIRUS VACCINE**
- **WHY AN EBOLA VACCINE IS IMPORTANT**
- **EBOLA VACCINE ELIGIBILITY**
- **BOOSTER DOSE ELIGIBILITY**

THE EBOLA VIRUS VACCINE:

ERVEBO ®(Ebola Zaire Vaccine, Live also known as V920, rVSV- ZEBOV- GP or rVSV- ZEBOV) is approved by theU.S. Food and Drug Administration(FDA) for the forestallment of complaint caused by Ebola contagion(EBOV; species Zaire ebolavirus) in individualities 12 months of time and aged as a single cure administration. ERVEBO is a iteration- competent, live, downgraded recombinant vesicular stomatitis contagion(rVSV) vaccine formed by Merck. It isn't practicable to come infected with EBOV from the vaccine because the vaccine only contains a gene from the Ebola contagion, not the entire contagion. specially, It contains a gene for the EBOV glycoprotein that replaces the gene for the native VSV glycoprotein. ERVEBO doesn't give security against other species of Ebolavirus or Marburgvirus. Antibody measures are frequently exercised as a surrogate test to prognosticate when security by a vaccine can be anticipated. Clinical trials have shown off that the vaccine elicits rapid-fire antibody reaction in 14 days after a single cure. Clinical efficacy of the vaccine was supported by a randomized package(ring) vaccination study during the 2014 – 2016 outburst in Guinea. 3,775 individuals who had close contact with confirmed Ebola Virus Disease (EVD) cases, along with their secondary contacts (connections of connections), received immediate vaccination.

No Individual who received the vaccine immediately developed Ebola virus disease (EVD) within 10 days or more post-vaccination. The additional protection provided by the ERVEBO vaccine, or the specific immune response it triggers against infection with Ebola virus (EBOV), remains unknown and is currently under investigation.

It's also not known whether it's operative when administered coincidently with antiviral drug, vulnerable globulin, and/ or race or tube transfusion. The duration of security conferred by an original cure of ERVEBO is also unknown. A supporter cure for people who have been preliminarily vaccinated may extend the duration of security for ERVEBO. Scientists remain to cover people who have entered the vaccine to get further.

IMPORTANCE OF EBOLA VACCINE :

A safe and effective vaccine is an important tool to cover frontal- line workers and help the preface and spread of Ebola complaint in the United States. Ebolaviruses are zoonotic pathogens that beget severe hemorrhagic fever in humans, known as Ebola complaint. There are four species of Ebolaviruses that are known to beget complaint in humans. Of these, Ebola contagion(EBOV; species Zaire ebolavirus), the cause of Ebola contagion complaint(EVD), is the most murderous, with case casualty rates of 70 – 90 if left undressed. EBOV is responsible for the maturity of recorded Ebola complaint outbreaks. This includes the two largest Ebola complaint outbreaks in history, the 2014 – 2016 West Africa outbreak and the 2018 outbreak in eastern Popular Republic of the Congo, where over 32,000 people were infected, and further than 13,600 deaths were reported. Importation of Ebola complaint to the United States by an infected rubberneck from an outbreak area is a honored threat with the eventuality for spread to other people. During the 2014 – 2016 Ebola complaint outbreak in West Africa, 11 people were treated for EVD in theU.S., and two of them failed. Nine cases among these were imported into the U.S.

Two healthcare workers within the United States contracted Ebola while caring for the first travel-associated Ebola case diagnosed in the country. Both healthcare workers subsequently recovered.

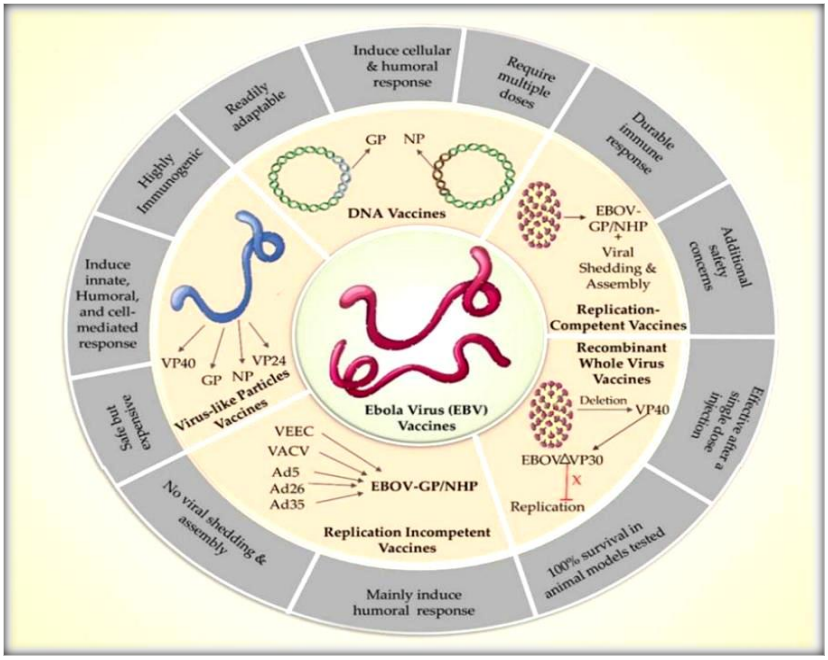

fig:10 (importance of ebola vaccine)

EBOLA VACCINE ELIGIBILITY:

ERVEBO is stocked in the Strategic National Stockpile and provided by the CDC for pre-exposure vaccination to individuals in three specific occupational categories, despite not being commercially marketed in the U.S.

1. **Ebola virus disease (EVD) responders** to an Ebola virus (EBOV; species Zaire ebolavirus) outbreak.

2. **Laboratory personnel** and their support staff who operate within bio-safety level 4 (BSL-4) or Laboratory Response Network facilities in the United States and handle specimens containing or potentially containing replication-competent EBOV fall into this category.

3. **Healthcare personnel (HCP)** working at federally designated Ebola Treatment Centers or state-designated Special Pathogens Treatment Centers, who are engaged in the care and transportation of patients infected with or suspected to be infected with EBOV, belong to this group.

Disclaimer: References to product names or entities not affiliated with the United States Government on CDC Ebola websites do not indicate an official endorsement of those products or entities by the CDC ,the Department of Health and Human Service, or the United States Government.

BOOSTER DOSE ELIGIBILITY:

Since booster dose vaccination is not included in ERVEBO's FDA-approved indication, the Centers for Disease Control and Prevention (CDC) is supporting an expanded access Investigational New Drug (IND) program. to allow booster dose administration for pre-exposure prophylaxis in adults (≥ 18 years of age) who were previously vaccinated (e.g., ≥ 6 months since prior vaccination) and who have potential risk of occupational exposure to EBOV. Decisions regarding the eligibility for booster doses will be evaluated on a case-by-case basis.

fig:11 (ebola vaccine booster dose)

WHO GLOBAL CLINICAL PLATFORM:

The World Health Organization (WHO) has established a secure Global Clinical Platform on RED Cap, containing anonymized patient-level clinical data, to aid in understanding Ebola's natural history, clinical features, prognostic factors, and outcomes. This platform aims to address the knowledge gap regarding differences and similarities between diseases caused by Zaire ebolavirus (EBOV) and Sudan ebolavirus (SUDV).

THE OBJECTIVES OF THE PLATFORM ARE TO:

1. describe the clinical characteristics of Ebola;
2. assess the variations in clinical characteristics of Ebola;
3. identify the association of clinical characteristics of Ebola with outcomes; and describe the temporal trends in clinical characteristics of Ebola.

WHO invites Member States, health facilities and other entities to participate in the global effort to collect anonymized clinical data relating to suspected, probable or confirmed cases of Ebola and contribute data to the WHO Global Clinical Platform. WHO has developed a clinical characterization case report form (CRF) to standardize data collection of clinical features among hospitalized cases at baseline (admission), during treatment, and at discharge or death. These three modules may be completed prospectively or retrospectively. The WHO's web-based electronic Global Clinical Platform for Ebola Virus Disease (EVD) allows for the quick and systematic gathering of anonymized clinical data, enabling the aggregation, tabulation, and analysis of data across various global settings and sub-populations. Hosted on REDCap, this platform ensures security with limited access and password protection. WHO will:

- Ensure the submitted data remains confidential and unauthorized disclosure is prevented.
- implement and maintain appropriate technical and organizational security measures to protect data stored on the WHO platform.

Entities wishing to contribute anonymized (i.e. Those who wish to submit clinical data to the WHO Global Clinical Platform for Ebola virus disease, after agreeing to the Terms of Use, can do so by emailing: evd_clinicaldataplatform@who.int, with personal identifiers removed. Upon acceptance of the Terms of Use, they will be granted access. log-in credentials. Contributors of data are kindly asked to ensure they acquire any necessary consent or approval prior to collecting and contributing data to the platform, and to diligently adhere to all guidelines. Protecting platform log-in credentials and passwords requires taking necessary measures. Access to data from other facilities will not be granted to data contributors. The process for data sharing is further described in Annex A.

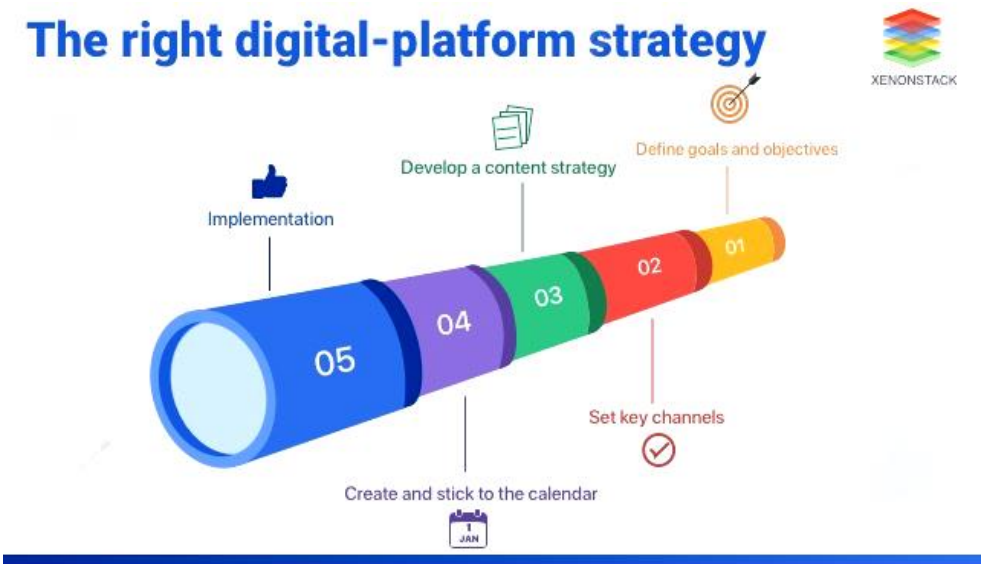

fig:12 (over come digital platform strategy)

CLINICAL CHARACTERIZATION CASE REPORT FORM :

The CRF is intended for gathering data directly from patient examinations and interviews, as well as from the review of hospital or clinical notes pertaining to individuals suspected, probable, or confirmed to have Ebola disease. (caused by Zaire and Sudan species).

THIS CRF HAS THREE MODULES:

Module 1: This form must be filled out on the initial day of presentation or admission to the Ebola Care Centre (ECC).

Module 2: This form should be filled out daily during inpatient stays, with a minimum requirement of once every three days.

Module 3: This form must be completed at the final visit, which includes hospital discharge, transfer, the last outpatient follow-up, or in the event of death.

The CRFs should be completed and updated throughout the outpatient management or stay in the health facility– including if the patient is transferred from one ward to another, i.e. from the date of admission to the hospital, until the date of death or discharge from the hospital, or transfer to another hospital. 3 Data may be collected prospectively or retrospectively through examination and review of medical records. To ensure the high value of information generated by the WHO Global Platform, it is critical that contributors ensure the completeness and quality of reported data.

CLINICAL ADVISORY GROUP:

WHO has formed an independent Clinical Advisory Group (CAG) that convenes regularly to provide advice to WHO regarding the global reporting and analysis of de-identified EVD data.

STATISTICAL ANALYSIS PLAN:

- Pending the availability of data, aggregated global figures will be compiled and presented. Depending on data availability, statistics at subnational, national, or broader regional levels may also be provided.

- A descriptive analysis will examine clinical characteristics upon hospital admission, throughout hospitalization, and interventions and clinical outcomes (including mortality and length of stay) upon discharge.
- Analysis by sub-populations will be performed where possible (e.g. children, pregnant women, populations with co-infection).

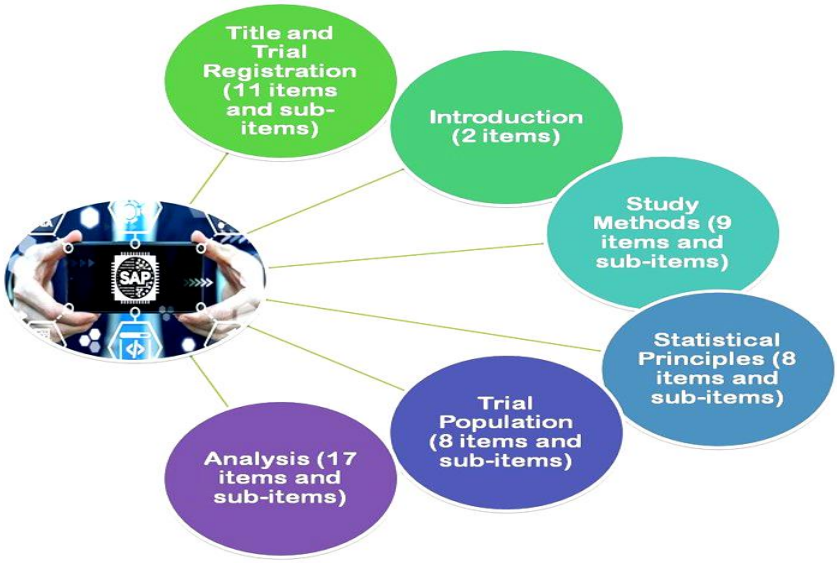

fig:13 (statistical analysis plan)

REPORTING AND PUBLICATION:

Regular data analysis will be conducted by WHO, and a summary report will be shared with all contributors. The report will subsequently be made publicly available on the WHO website.

When feasible and suitable, data will be presented in an aggregated manner alongside other data supplied to WHO by third parties. As such, facility-level information will not be identifiable, meaning that data contributors will still be able to publish their data elsewhere. Indeed, while publication in a peer-reviewed scientific journal is not the primary purpose of WHO repository, Data contributors are urged to conduct analyses and publish findings based on their individual datasets.

The reports will appropriately acknowledge data contributors of EVD data.

ANNEX A – DATA SHARING WITH WHO:

World Health Organization has launched a Global Clinical Platform for Ebola virus disease, (the "EVD Data Platform") to enable State Parties to the International Health Regulations (IHR) (2005) and other entities to share with WHO anonymized clinical data and information relating to patients suspected or confirmed to have EVD (collectively, the "Anonymized EVD Data").

State Parties to the IHR are invited to contribute Anonymized EVD Data collected by such State Parties (including, without limitation, by their ministries of health or public health agencies or institutions) through the WHO EVD Clinical Data Platform, pursuant to and in line with the requirements of the IHR (2005). Healthcare facilities, universities, and research networks, among other entities, are welcome to submit their de-identified EVD data to the WHO EVD Clinical Data Platform, provided they adhere to the specified guidelines and requirements with the Terms of Use.

The Anonymized EVD data received from State Parties to the IHR and/or entities through the EVD Data Platform will remain property of the contributing State Party or entity, as applicable, and will be used by WHO to inform appropriate public health response and the development of clinical guidance concerning EVD.

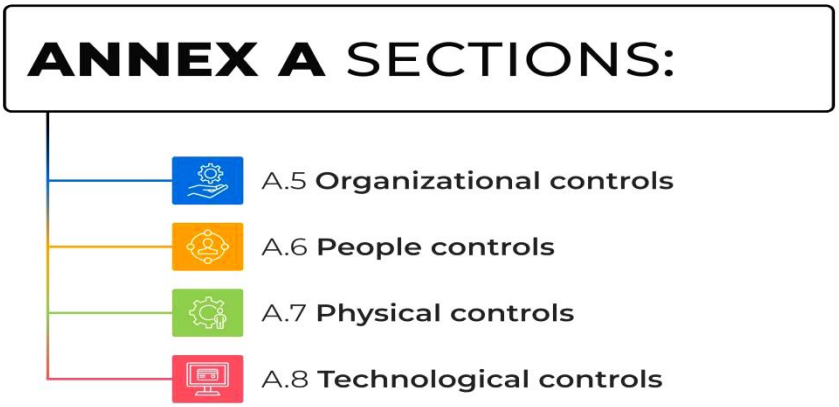

fig:14 (annex a – data sharing with who)

State Parties to the IHR and/or other entities wishing to contribute Anodized EVD Data to the WHO EVDP latformshould email to view the Terms of Use and obtain log-in credentials for the EVD Platform.

Following Article 11(4) of the International Health Regulations (2005), the WHO will abstain from sharing the specific dataset of anonymized Ebola Virus Disease (EVD) data with other State Parties or third parties until specific conditions are fulfilled, including those outlined in paragraph 2 of Article 11, after consulting with the affected countries.

According to Article 11, the WHO will withhold anonymized Ebola Virus Disease (EVD) data from the public unless and until such anonymized data has been provided to State Parties beforehand , Given that other information regarding the EVD epidemic has already been made public and there is a requirement for the distribution of reliable and impartial information.

COVID-19 DISEASE:

COVID-19, or Corona-virus Disease 2019, is a highly contagious respiratory illness caused by the novel corona-virus SARS-CoV-2. First identified in December 2019 in Wuhan, China, it quickly spread globally, leading to a devastating pandemic. The virus primarily spreads through respiratory droplets when an infected person coughs, sneezes, or talks, and it can also be transmitted by touching surfaces contaminated with the virus and then touching the face.

Symptoms of COVID-19 vary widely and can range from mild to severe. Typical symptoms comprise fever, cough, difficulty breathing, fatigue, muscle or body discomfort, loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, and Diarrhea. While many individuals experience mild illness, some develop severe complications such as pneumonia, acute respiratory distress syndrome (ARDS), organ failure, and death, particularly among older adults and those with underlying health conditions. The global response to COVID-19 has been multifaceted, involving public health measures, vaccination campaigns, and ongoing research efforts. Governments, healthcare systems, and international organizations have implemented various strategies to control the spread of the virus, including lock-downs, quarantine measures, travel restrictions, mask mandates, and social distancing protocols.

Vaccination against COVID-19 has played a critical role in reducing the spread of the virus and preventing severe illness and death. Multiple vaccines have been developed and authorized for emergency use, offering hope for controlling the pandemic. However, challenges such as vaccine distribution, vaccine hesitancy, and the emergence of new variants continue to pose threats to global efforts to end the pandemic. COVID-19 has had profound social, economic, and public health impacts worldwide, disrupting daily life, straining healthcare systems, and exacerbating existing inequalities. The pandemic has underscored the importance of global cooperation, scientific innovation, and community resilience in addressing public health emergencies

of this magnitude. As the world continues to navigate the challenges of COVID-19, collaboration among governments, healthcare professionals, researchers, and communities remains essential in overcoming the pandemic and building a more resilient future.

TRANSMISSION:

The transmission of COVID-19, caused by the novel corona-virus SARS-CoV-2, occurs primarily through respiratory droplets when an infected person coughs, sneezes, or talks. The droplets have the potential to reach the mouths or noses of individuals nearby, or they may be inhaled into the lungs, resulting in infection. Additionally, the virus can spread through touching surfaces or objects contaminated with the virus and then touching one's mouth, nose, or eyes. This way of spreading is called fomite transmission. The virus is most contagious when an infected person is symptomatic, but it can also spread from people who are asymptomatic or presymptomatic, meaning they are infected but have not yet developed symptoms. This makes controlling the spread of the virus challenging, as individuals may unknowingly transmit the virus to others.

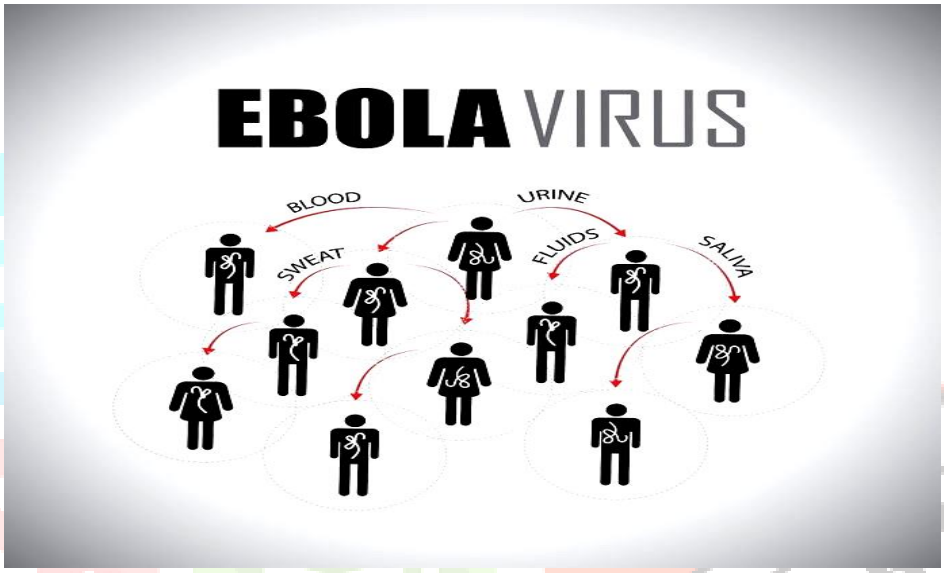

fig:15 (transmission to person to person)

Close contact with infected individuals, particularly within a distance of about six feet, increases the risk of transmission. Enclosed spaces with poor ventilation also pose a higher risk, as the virus can linger in the air for extended periods, especially in crowded settings. Certain activities and behaviors can also increase the likelihood of transmission, such as singing, shouting, exercising vigorously, and attending large gatherings where social distancing is not maintained. Preventive measures such as wearing masks, practicing physical distancing, frequent hand washing, using hand sanitizer, and avoiding close contact with sick individuals are crucial in reducing the risk of transmission. Public health interventions such as contact tracing, quarantine measures, and isolation of infected individuals also play a significant role in controlling the spread of the virus. Vaccination against COVID-19 has emerged as a critical tool in preventing transmission by reducing the likelihood of infection and severe illness. Vaccination campaigns aim to achieve herd immunity, where a sufficient proportion of the population is immune to the virus, thereby limiting its spread within communities. Ongoing research continues to improve our understanding of transmission dynamics and inform effective strategies for controlling the pandemic.

SYMPTOMS : OF COVID-19

1. Fever or chills
2. Cough
3. Shortness of breath or difficulty breathing
4. Fatigue
5. Muscle or body aches
6. Headache
7. New loss of taste or smell
8. Sore throat
9. Congestion or runny nose
10. Nausea or vomiting
11. Diarrhea

SOME SEVERE SYMPTOMS OF COVID-19 INCLUDE:

1. Severe difficulty breathing or shortness of breath
2. Persistent chest pain or pressure
3. Confusion or inability to stay awake
4. Difficulty speaking or moving
5. Persistent high fever
6. Severe abdominal pain
7. Loss of consciousness

PREVENTION:

Prevention measures are essential in reducing the spread of COVID-19. Here are some key preventive actions:

1) **Wear Masks:** Wear a mask that covers your nose and mouth when in public settings, especially where social distancing measures are difficult to maintain. Masks aid in stopping respiratory droplets from spreading to others.

2) **Practice Physical Distancing:** Maintain at least 6 feet of distance from others, particularly those who do not live in your household. Avoid large gatherings and crowded places.

3) **Frequent Hand washing:** Wash your hands often with soap and water for at least 20 seconds, especially after being in public places, touching surfaces, or coughing/sneezing. If soap and water aren't accessible, utilize hand sanitizer containing a minimum of 60% alcohol.

4) **Avoid Touching Face:** Avoid touching your eyes, nose, and mouth with unwashed hands, as this can transfer the virus from surfaces to your body.

5) **Practice Respiratory Hygiene:** Cover your mouth and nose with a tissue or your elbow when coughing or sneezing, Properly discard tissues and wash your hands immediately afterwards.

6) **Stay Home When Sick:** If you feel unwell or experience symptoms of COVID-19, stay home and avoid contact with others. Seek medical advice and get tested for COVID-19 if necessary.

7) **Get Vaccinated:** Vaccination against COVID-19 is a crucial tool in preventing infection and reducing the severity of illness. Follow vaccination guidelines and get vaccinated when eligible.

8) **Clean and Disinfect:** Clean and disinfect frequently touched surfaces daily, including doorknobs, light switches, countertops, and electronic devices.

9) **Follow Public Health Guidelines:** Stay informed about local guidelines and recommendations from public health authorities. Follow quarantine, isolation, and travel restrictions as directed.

TESTING AND DIAGNOSIS:

Testing and diagnosis play a crucial role in identifying and controlling the spread of COVID-19. Here's an overview of testing methods and diagnostic procedures:

1. **PCR Testing:** Polymerase Chain Reaction (PCR) tests are the gold standard for diagnosing COVID-19. This test detects the genetic material of the virus in respiratory samples, such as nasal swabs or throat swabs. PCR tests are highly accurate and reliable, but results may take several hours to days to process in a laboratory.

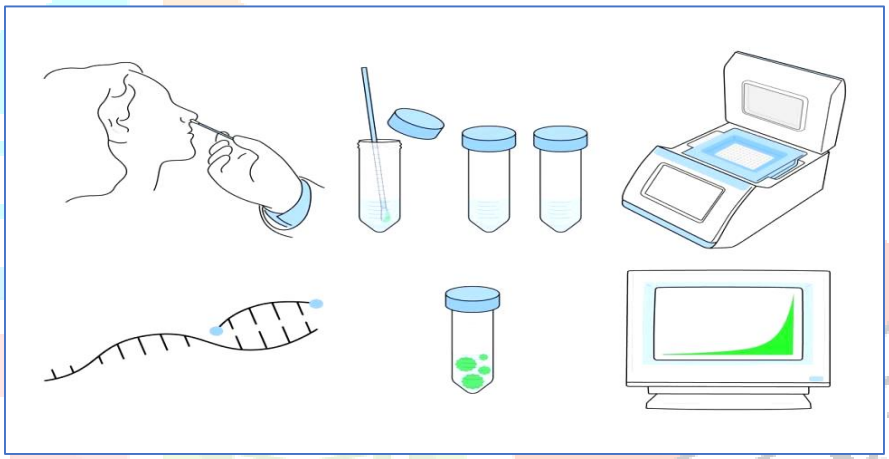

fig:16 (pcr testing)

2. **Rapid Antigen Testing:** Rapid antigen tests detect specific proteins on the surface of the virus. These tests provide results in minutes, making them useful for rapid screening in various settings, including healthcare facilities, workplaces, schools, and community testing sites. However, they may be less sensitive than PCR tests, particularly in individuals with low viral loads or asymptomatic infections.

3. **Antibody Testing:** Antibody tests, also known as serology tests, detect antibodies produced by the immune system in response to a COVID-19 infection. These tests are typically performed using a blood sample and can indicate past infection, but they are not used for diagnosing active infections.

4. **Point-of-Care Testing:** Some rapid tests, including molecular and antigen tests, can be performed at the point of care, such as clinics, pharmacies, or healthcare facilities, providing results within minutes.

5. **Self-Testing Kits:** Self-testing kits for COVID-19 are becoming increasingly available, allowing individuals to collect their own samples (such as nasal swabs) at home and perform the test themselves. Results can be obtained within minutes or hours, depending on the type of test.

6. **Diagnostic Criteria:** Diagnosis of COVID-19 is based on a combination of symptoms, exposure history, and test results. Healthcare providers use clinical judgment to determine whether testing is necessary and which type of test is most appropriate based on the individual's circumstances.

7. **Follow-Up Testing:** In some cases, repeat testing may be necessary, especially for individuals with symptoms who initially test negative. Repeat testing can help confirm or rule out infection, particularly if symptoms persist or worsen.

VACCINATION:

Vaccination against COVID-19 is a critical tool in controlling the spread of the virus and preventing severe illness, hospitalization, and death. Here's an overview of COVID-19 vaccination:

1) **Vaccine Development:** Multiple COVID-19 vaccines have been developed and authorized for emergency use around the world. These vaccines underwent rigorous clinical trials to ensure safety, efficacy, and quality standards.

2) **Types of Vaccines:** COVID-19 vaccines utilize various technologies, including mRNA vaccines (such as Pfizer-BioNTech and Moderna), viral vector vaccines (such as Johnson & Johnson's Janssen and AstraZeneca), and protein subunit vaccines (such as Novavax). Each vaccine stimulates the immune system to recognize and fight the virus.

3) **Vaccine Distribution:** Vaccination campaigns are underway globally to administer COVID-19 vaccines to eligible populations. Prioritization is often given to healthcare workers, frontline workers, older adults, individuals with underlying health conditions, and other high-risk groups.

4) **Dosing Schedule:** Most COVID-19 vaccines require two doses administered several weeks apart for full vaccination. Some vaccines, such as the Johnson & Johnson's Janssen vaccine, require only a single dose.

5) **Effectiveness:** COVID-19 vaccines have demonstrated high efficacy in preventing COVID-19 illness, severe disease, and death. However, breakthrough infections can still occur, particularly with emerging variants of the virus. Vaccination also reduces the risk of transmitting the virus to others.

6) **Side Effects:** Common side effects of COVID-19 vaccines are mild and temporary, including pain at the injection site, fatigue, headache, muscle pain, chills, fever, and nausea. Serious adverse events are rare but are closely monitored by health authorities.

7) **Vaccine Hesitancy:** Vaccine hesitancy, fueled by misinformation and concerns about safety and efficacy, remains a challenge in some communities. Education, outreach efforts, and transparent communication about the benefits and risks of vaccination are essential in addressing vaccine hesitancy.

8) **Global Equity:** Ensuring equitable access to COVID-19 vaccines worldwide is crucial in controlling the pandemic. Efforts are underway to distribute vaccines to low- and middle-income countries through initiatives such as COVAX.

9) **Booster Shots:** Booster doses of COVID-19 vaccines may be recommended to enhance and prolong immunity, particularly in the face of waning immunity or the emergence of new variants.

TREATMENT: OF COVID-19

Treatment for COVID-19 involves a combination of supportive care, antiviral medications, and other therapies to manage symptoms and prevent complications. Here are some key aspects of COVID-19 treatment:

1) **Supportive Care:** For mild cases, treatment often involves rest, hydration, and over-the-counter medications to alleviate symptoms such as fever, cough, and body aches. Patients are advised to isolate themselves to prevent transmission to others.

2) **Hospitalization:** Severe cases may require hospitalization, especially if the patient experiences difficulty breathing or oxygen levels drop. In the hospital, patients may receive supplemental oxygen therapy, intravenous fluids, and medications to reduce inflammation and support vital functions.

3) **Antiviral Medications:** Certain antiviral drugs, such as remdesivir, may be used to treat hospitalized patients with severe COVID-19. Remdesivir works by inhibiting the replication of the virus and has been shown to shorten the time to recovery in some cases.

4) **Steroids:** Corticosteroids, such as dexamethasone, are used to reduce inflammation and prevent complications in patients with severe COVID-19. Steroids are typically reserved for patients who require supplemental oxygen or mechanical ventilation.

5) **Monoclonal Antibodies:** Monoclonal antibody therapies, such as bamlanivimab and casirivimab/imdevimab, may be used to treat mild to moderate cases of COVID-19 in high-risk individuals who are not hospitalized. These antibodies help neutralize the virus and reduce the risk of progression to severe illness.

6) **Convalescent Plasma:** Convalescent plasma, obtained from individuals who have recovered from COVID-19 and contain antibodies against the virus, may be used as a treatment option for some patients with severe illness. The antibodies in convalescent plasma can help boost the immune response and aid in fighting the virus.

7) **Ongoing Research:** Research into new treatments and therapies for COVID-19 is ongoing. Clinical trials are evaluating various drugs, immune modulators, and combination therapies to determine their safety and efficacy in managing the disease.

CONCLUSION:

While both Ebola and Covid-19 are deadly diseases, Ebola has shown to have a significantly higher fatality rate, potentially making it up to 20 times deadlier than Covid-19. However, it's important to note that the transmission dynamics and overall impact on global health and economies can vary significantly between the two diseases. In conclusion, Ebola has demonstrated a much higher fatality rate compared to Covid-19, potentially making it up to 20 times deadlier. Ebola disease, caused by the Ebola virus, has garnered significant attention due to its terrifyingly high mortality rate. Compared to Covid-19, Ebola's deadliness is staggering, potentially being up to 20 times deadlier. While Covid-19 has wreaked havoc globally, Ebola's ability to swiftly overwhelm communities with its lethal potency is a reminder of the acute threats posed by certain infectious diseases. One of the defining characteristics of Ebola is its exceptionally high fatality rate, which can range from 25% to 90% depending on the strain and the quality of medical care available. In contrast, Covid-19 has a much lower case fatality rate, estimated to be around 1-2% globally. This stark difference underscores the severity of Ebola infections and the devastating impact it can have on affected populations.

Moreover, Ebola's mode of transmission contributes to its deadliness. It spreads through direct contact with bodily fluids of infected individuals or through contact with contaminated surfaces or materials. This close-contact transmission presents significant challenges for containment efforts, as it requires rigorous infection control measures and rapid isolation of cases to prevent further spread. In comparison, Covid-19 primarily spreads through respiratory droplets and aerosols, which although highly contagious, can be mitigated to some extent through measures like mask-wearing and social distancing. The impact of Ebola outbreaks extends beyond the immediate health consequences. The disease can devastate healthcare systems in affected regions, overwhelming hospitals and healthcare workers.

Additionally, the fear and stigma associated with Ebola can hinder efforts to control the outbreak, leading to further transmission and loss of life. While Covid-19 has dominated global attention and resources in recent years, the threat of Ebola remains ever-present, particularly in regions where it is endemic. Despite progress

in developing vaccines and treatments for Ebola, challenges such as access to healthcare, community engagement, and effective surveillance persist. In conclusion, Ebola's potential to be 20 times deadlier than Covid-19 highlights the urgent need for continued vigilance and investment in preparedness and response efforts for emerging infectious diseases. While the world grapples with the ongoing Covid-19 pandemic, it is crucial not to overlook the persistent threat posed by diseases like Ebola and to prioritize measures to prevent and control future outbreaks.

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