

## Highlight on Health Medical Developments-Expected Questions 2017 Part-3 (Download PDF)

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We will be covering the important questions and topics for competitive examinations for 2017 related to Defense and related policies. As per video tutorials and lectures at [YouTube@Examrace](#)

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### **Expected Questions on Health: UPSC IAS 2017**

#### Leptospirosis

- Leptospirosis (or field fever, rat catcher's yellows, and pretibial fever): Infection caused by corkscrew-shaped bacteria called *Leptospira*.
- Symptoms: Headaches, muscle pains, and fevers; bleeding from the lungs or meningitis.
- Person turns yellow, have kidney failure and bleeding - Weil's disease.
- Bleeding from the lungs - severe pulmonary haemorrhage syndrome.
- 13 different types of *Leptospira* may cause disease in humans.
- Transmitted by both wild and domestic animals mainly rodents
- Transmission: Animal urine or by water or soil containing animal urine coming into contact with breaks in the skin, eyes, mouth, or nose.

#### STATINS and QRisk2

- Statins: Drugs that lower cholesterol levels by inhibiting enzyme HMG-CoA reductase (produce 70 % cholesterol of the body in the liver)
- High cholesterol levels: Associated with cardiovascular disease (CVD). Statins prevent cardiovascular disease in those who are at high risk.
- QRISK2 (QRISK): Prediction algorithm for CVD. Uses traditional risk factors (age, systolic blood pressure, smoking status and ratio of total serum cholesterol to high-density lipoprotein cholesterol) with BMI, ethnicity, measures of deprivation, family history, chronic kidney disease, rheumatoid arthritis, atrial fibrillation, diabetes and antihypertensive treatment.

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- QRISK over 20 (20 % risk of CVD event over next ten years) indicates that primary prevention with lipid lowering therapy (like statins) should be initiated.

### ReANIMA

- World's first clinical trial on the revival of brain dead patients
- Joint Venture: US company & Rudrapur (Uttarakhand) based hospital
- India currently has no laws for clinical trials on 'living cadaver' or brain dead patients
- Study: Effects of stem cell therapy, Median Nerve Stimulation and a laser therapy on comatose patients

### Rotavirus Vaccine

- Use: To treat diarrhoea
- Now part of Universal immunization program (1985 – largest program in world)
- Developed indigenously under a PPP mode of Ministry of Science and Ministry of Health and Family welfare
- Other new vaccines are being introduced as part of UIP:
  - Inactivated Polio Vaccine (IPV)
  - Measles, Rubella (MR) vaccine
  - Adult Japanese Encephalitis (JE) vaccine

### Augmented Humanity

- A phrase that was coined in 2010 by Eric Schmidt (ex-Google CEO)
- Use of technology to both aid and replace human capability that joins person and machine as one
- Wearable devices - what we want through our mood, heart rate and body temperature
- Defines machinery used to replace or enhance parts of the body

### MenAfriVac

- Meningitis A vaccine manufactured by the Pune-based Serum Institute of India.
- It's a controlled temperature chain (CTC) vaccine means it can sustain high temperature up to 40°C for upto 4 days.
- Normally a vaccine needs to be kept at 2 - 8 degree but it's exceptional.

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- Immunization program conducted in sub-Saharan Africa countries with this vaccine - funded by GAVI and WHO/PATH.

### **Benefits of MenAfriVac**

- Sustain high temperature without being affected in quality
- Carried to far flung areas for vaccination
- Production Cost per vaccine is low
- Maintenance cost of this vaccine is less.
- Reduced logistic burden
- Reduced wastage
- No need for workers to return to refilling stations every day.

*Image of MenAfrivac*

### **Neurobridge Technology**

- Specialized sleeve on forearm to communicate with a chip implanted in Patient's brain
- Chip processes patient's thoughts, then bypasses the spinal cord, sending signals directly to the sleeve to produce movement.

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- Within a tenth of a second, Patient's thoughts are translated into action.

## cDNA

- Complementary DNA (cDNA) is DNA synthesized from a messenger RNA (mRNA) template in a reaction catalysed by the enzymes reverse transcriptase.
- Used to clone eukaryotic genes in prokaryotes.
- Express a specific protein that does not express that protein (i. e. , heterologous expression), transfer cDNA that codes for the protein to the recipient cell.
- It is also produced by retroviruses (such as HIV-1, HIV-2, Simian Immunodeficiency Virus, etc. ) and then integrated into the host's genome where it creates a provirus.
- It refers to mRNA transcript sequence, expressed as DNA bases (GCAT) rather than RNA bases (GCAU).

*Image of Complementary DNA*

## DNA Fingerprinting

- Called DNA profiling.
- Principle of No two persons can have same DNA sequence except identical twins.
- Sample from hair, skin, blood and semen

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- Helps solve crimes and determine paternity.
- Concerns about sample contamination, faulty preparation procedures, and erroneous interpretation of the results.

*Image of DNA Fingerprinting*

### Introgressive Hybridization

- Hybridization technique in which gene from species is moved to another species repeatedly backcrossing with one of its parent species.
- Genetic variation is introduced and it prevents stable population which is required for wide range of adaptability.
- Indian agriculture scientists at the Rice Research Station, Kerala Agricultural University developed rice which can tolerate submergence in water and can sustain salinity water intrusion in coastal areas.

### Reverse Vaccine

- Improvement on vaccinology that employs bioinformatics
- By Rino Rappuoli
- 1st used against Serogroup B meningococcus
- Entire pathogenic genome can be screened using bioinformatics approaches to find genes.