Vaccine Alliance

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Background

Coronaviruses and SARS-CoV-2

2002-2003
Severe Acute Respiratory Syndrome (SARS)

2012-Present
Middle East Respiratory Syndrome (MERS)

2019-Present
Severe Acute Respiratory Syndrome (SARS-CoV-2)
Background

Unprecedented Global Crisis
A simulation of four spike proteins, each bending on three hinges.
Sören von Bülow, Mateusz Sikora and Gerhard Hummer, Max Planck Institute of Biophysics
Scientific Progress
Vaccine Technologies

Traditional Virus Vaccines
- Inactivated vaccines contain SARS-CoV-2 that is grown in cell culture and then chemically inactivated.
- Live attenuated vaccines are made of genetically weakened versions of SARS-CoV-2 that is grown in cell culture.

Protein and Protein Nanoparticles
- Recombinant spike-protein-based vaccines.
- Recombinant RBD-based vaccines.
- VLPs carry no genome but display the spike protein on their surface.

Viral Vector Vaccines
- Replication-incompetent vector vaccines cannot propagate in the cells of the vaccinated individual but express the spike protein within them.
- Replication-competent vector vaccines can propagate to some extent in the cells of the vaccinated individual and express the spike protein within them.

Nucleic Acid Based Vaccines
- Inactivated virus vector vaccines carry copies of the spike protein on their surface but have been chemically inactivated.
- DNA vaccines consist of plasmid DNA encoding the spike gene under a mammalian promoter.
- RNA vaccines consist of RNA encoding the spike protein and are typically packaged in LNP.

Spike gene
Previous Experience

Ebola and Zika
Regulatory Agility
Standard v Accelerated Process

Standard Process

COVID-19 Vaccines
Safety Monitoring

Vaccine Lifecycle

- Vaccine Development Stage
- Vaccine Safety Monitoring

Quality
- small scale studies
- in vitro
- in vivo
- Pharmaceutical quality

Toxicity
- Non-clinical
- Clinical trials

EudraVigilance – European database of suspected adverse reaction to medicines

Extended Clinical Trials (phase IV)
- Global Reporting NCA
- Medical Literature
- Safety Studies
- Reports from HCP and Patients
- Post-Marketing Safety Monitoring

Official Authorisation

Post-marketing safety monitoring continually assessed
Safety Monitoring
Post Approval

HPRA Safety Monitoring Actives:

• Overseeing enhanced passive reporting from health-care professionals and members of the public, as well as the HSE, of suspected adverse reactions, with onward reporting of anonymised individual case safety reports to the EMAs Eudravigilance database, for inclusion in further analysis to detect and evaluate any potential signals.

• Onward provision of anonymised vaccine coverage data, to enable scientific analysis of observed rates of adverse events of special interest.

• Aligning with EMA plans to communicate regular and periodic public updates on safety experience.

• Involvement in EU-wide safety reviews, including of periodic data provided by the marketing authorisation holders, as well as any emerging data from other sources, such as independent studies.

• Escalation of emerging safety issues, if any, as appropriate.
## Rolling Reviews and Conditional Marketing Authorisations

### Leading Vaccine Candidates

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<th>Vaccine Manufacturer</th>
<th>Start Rolling Review</th>
<th>CMA Review Start</th>
<th>CHMP Opinion</th>
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<tr>
<td>Pfizer-BioNTech</td>
<td>Oct 6</td>
<td>Dec 1</td>
<td>Dec 21</td>
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<tr>
<td>Moderna</td>
<td>Nov 16</td>
<td>Dec 1</td>
<td>Jan 12</td>
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<tr>
<td>* Timeline may be subject to change due to later start of rolling review/less early interaction w/EMA</td>
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<tr>
<td>AstraZeneca</td>
<td>Oct 1</td>
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<td>Janssen</td>
<td>Dec 1</td>
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Estimated CHMP Opinion for Moderna and Janssen to be published in Q4 2020.