Challenges in the Supply of Influenza Vaccines during the COVID-19 Pandemic and Lessons Learned

Beverly Taylor

(Seqirus Vaccines on behalf of IFPMA Influenza Vaccine Supply Taskforce)

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Key messages

- Impact of Covid-19 pandemic on seasonal influenza
- Learnings from COVID-19 Pandemic
- Systems and programmes established for seasonal influenza enable rapid response to pandemics
- Rapid access to genetic sequence data and epidemiological data is critical
- Public-Private collaboration is essential in the response to public health crises

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COVID-19 Impact on Influenza

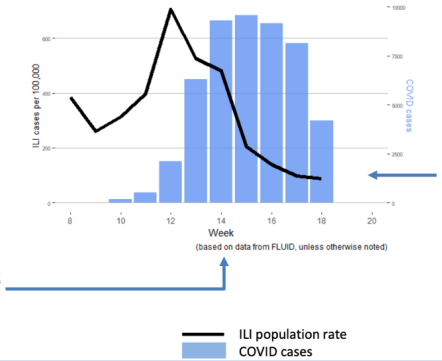
- Reduced influenza activity detection
- Assurance that SARS-CoV-2 could not be adventitious agent
- Reduced staff levels
- Logistical Challenges
- Increased demand for influenza vaccines for SH 2020 SH and NH 2020-21 seasons

Reduced Influenza Activity Detected

Sentinel syndromic surveillance in the context of COVID-19 – Disruptions to influenza surveillance

- Public health measures decreased flu transmission and morbidity (**stay at home orders**)
- However, external factors could threaten the utility of syndromic respiratory disease surveillance for flu and COVID-19:

1. ***Changes in healthcare delivery and healthcare seeking behavior.***
   - healthcare avoidance/worried well visits
   - change to teleconsultations/call first/**recommend not to visit GP policies**/hotlines/self-assessment tools



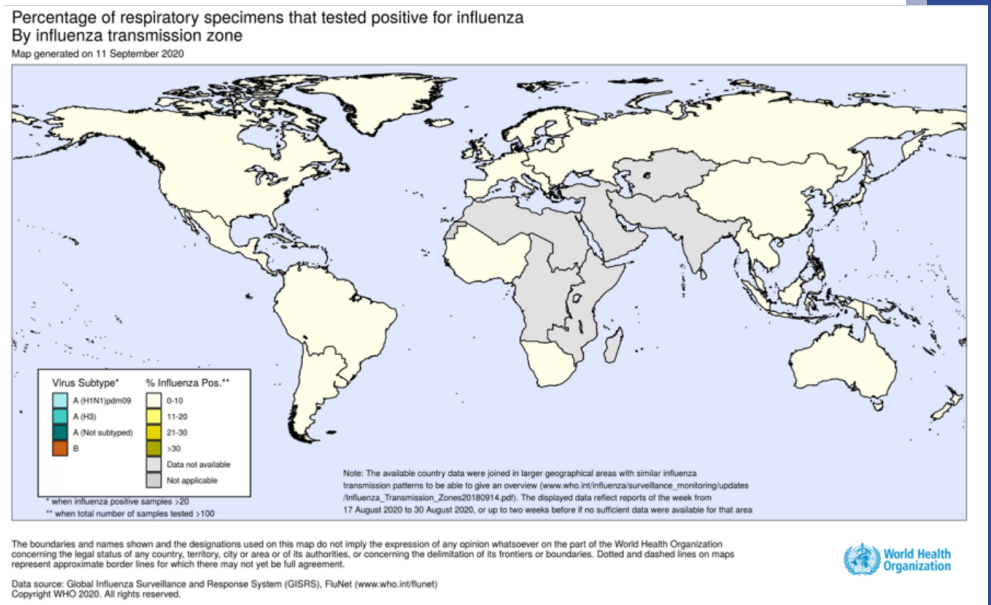
2. ***Changes to surveillance sites and systems:***
   - Case definition changes
   - Repurposing of staff and sites
   - Material resource constraints
   - Dedicated COVID testing labs
3. ***Reporting disruptions***
   - No access to data
   - Delays and errors
   - Human resource constraints
   - IT issues (ADS)
4. ***Transport restrictions***
   - Decreased material and virus shipping

World Health Organization

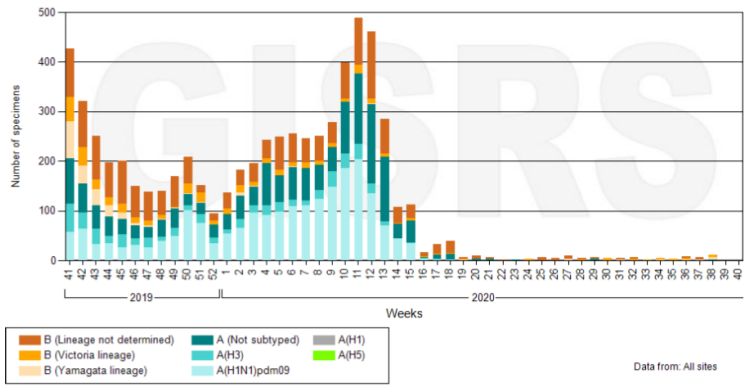
HEALTH EMERGENCIES programme

62% drop in influenza virus shipments to WHO CCs

94% drop in genetic sequences uploaded to GISAID



Number of specimens positive for influenza by subtype in the southern hemisphere



Data source: FluNet (www.who.int/flunet). Global Influenza Surveillance and Response System (GISRS)
Data generated on 09/10/2020

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Potential COVID-19 impact on influenza surveillance

- Reduced opportunity to identify virus providing best coverage
- Late-emerging viruses may not be detected in time for Vaccine Composition Meetings
- Antigenically different viruses causing disease in different regions
- Potential for mis-match between circulating viruses and vaccine strains for NH 2020/21 season

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Assurance that SARS-CoV-2 could not be an adventitious agent

Initial concerns raised that a small proportion of influenza-positive clinical samples may be co-infected with SARS-CoV-2 virus due to co-circulation, with the risk of contamination of influenza vaccine seed stocks

- Studies were carried out to establish if SARS-CoV-2 could be propagated in eggs or MDCK cells(the most commonly used substrates currently used for propagating influenza viruses)
- The results, including those reported by Barr et al[1], indicated that even if clinical samples contained both influenza and SARS-CoV-2 viruses, the latter would be unlikely to be propagated and would be undetectable after a small number of passages in either eggs or MDCK cells.
- The results provided reassurance for staff handling the samples and confidence that that it would be unlikely that important influenza candidate vaccine viruses or final vaccine lots would be lost due to SARS-CoV-2 contamination

[1] Barr Ian G, Rynehart Cleve, Whitney Paul, Druce Julian. SARS-CoV-2 does not replicate in embryonated hen's eggs or in MDCK cell lines. Euro Surveill.. 2020;25(25):pii=2001122. https://doi.org/10.2807/1560-7917.ES.2020.25.25.2001122

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Manufacturing Logistical Challenges

National lockdowns due to COVID-19 pandemic started not long after the WHO NH strain recommendation. This resulted in:

- Reduced number of flights
- Border closings
- Excessive information requests at Customs
- Challenges with international couriers due to reduced staff
- Shortage of diagnostic supplies

These challenges resulted in shipments to manufacturers in some regions being delayed or even prevented, which impacted supply of:

- Candidate vaccine viruses (CVV's)
- Potency assay reagents
- PPE supplies
- Raw materials required for manufacturing and testing

Increased demand for influenza vaccines for 2020 SH and 2020-21 NH seasons

Due to concerns about the potential for health care systems to be overwhelmed during the winter months with the co-circulation of COVID-19 with influenza, demand for influenza vaccine increased for both SH 2020 and more recently for NH 2020/21 season

- Manufacturers responded by increasing and extending manufacturing campaigns; however, the ability to dramatically increase supply in a short period of time is limited and additional doses produced will require acceptance of later delivery compared to "normal" seasons
- Through SH 2020 there was an expansion of influenza vaccination recommendations, a wide range of vaccination settings and an extension of vaccination campaigns in several countries
- WHO SAGE Seasonal Influenza Vaccination Recommendations during the COVID-19 Pandemic: highest priority groups are older adults and health care professionals, followed by other priority groups.
- Important to continue to vaccinate against influenza, as lockdown measures are eased could see rapid resurgence of influenza

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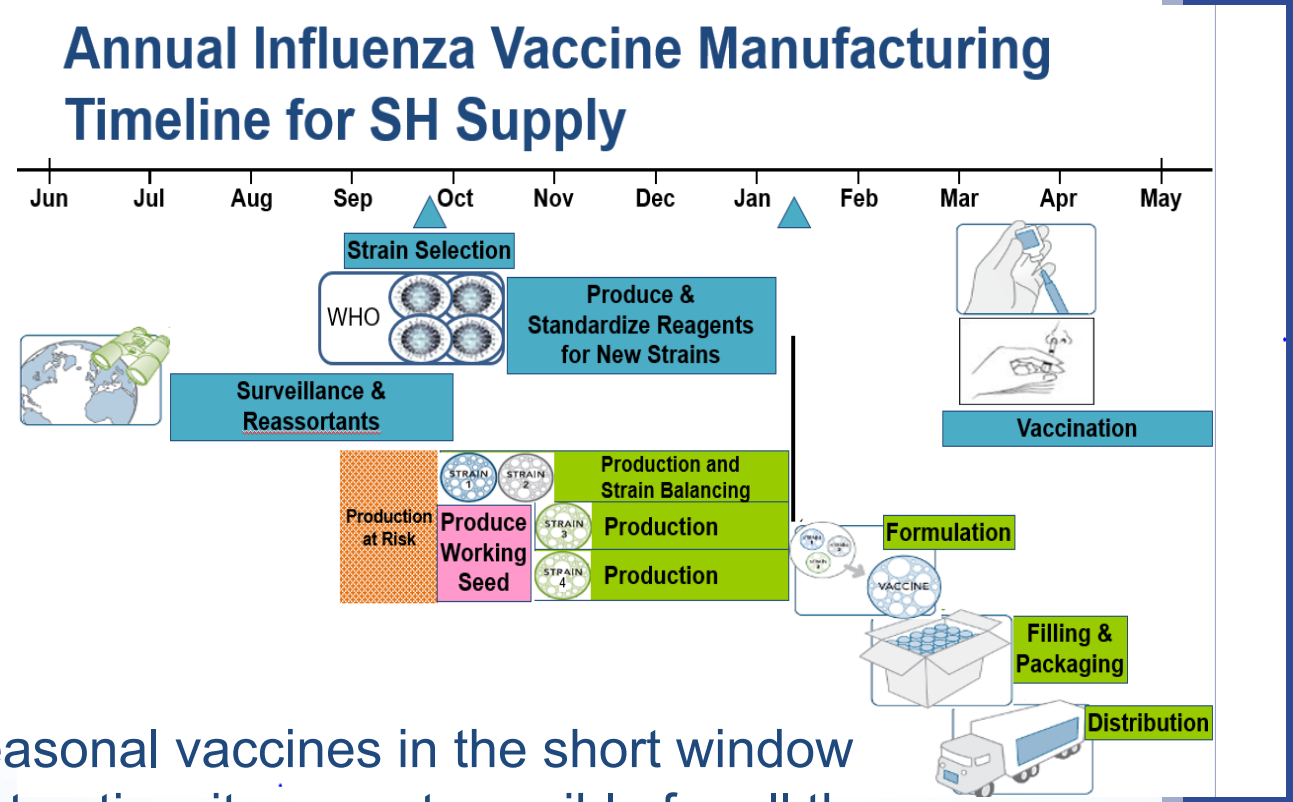
Challenges for Manufacturers

- Early forecasting is critical as planning for a seasonal manufacturing campaign starts 12-18 months prior to the season's vaccination campaign
- This year there were very short lead times for manufacturers to respond to increase in demand for both SH and NH seasons
- Despite this manufacturers have been able to supply additional doses by extending their production campaigns (approximate increase of 20% globally)



- However, as the capacity to produce more seasonal vaccines in the short window of a campaign is limited, particularly with short notice, it was not possible for all the extra demand to be addressed.

Challenges with vaccination campaigns

- Several policies, such as vaccination strategies to accommodate physical distancing measures, changes in population recommendations, and timing and location of vaccination have been implemented to increase influenza vaccine uptake during the COVID-19 pandemic
    - Novel approaches to vaccine administration within the traditional clinic settings and through alternative models allow people to maintain a safe distance while being vaccinated have included pharmacies, carparks/parking lots, cinemas, offices, church or community halls, or parks and outdoor areas
    - As some of the additional doses were received later than usual, some countries also extended their vaccination campaigns. For examples, to achieve high immunization rates, the Australian government worked with industry to align delivery dates of vaccine to immunization sites upon availability, although demand was so great at times that short-term shortages occurred
- Policy changes and strong public education can potentially optimize influenza vaccine coverage as doses become available throughout the season, but these need to be sustained into future seasons to maintain vaccine uptake and achieve the required on-time supply of doses, including influenza vaccines that are specifically designed for certain populations.

Learnings from COVID-19 Pandemic

- Rapid Sharing of GSD is critical
- Established GISRS system was used for COVID-19 surveillance
- Seasonal Influenza Programmes enable rapid response to any pandemic
- COVAX Facility - Collaboration from multiple Stakeholders is essential

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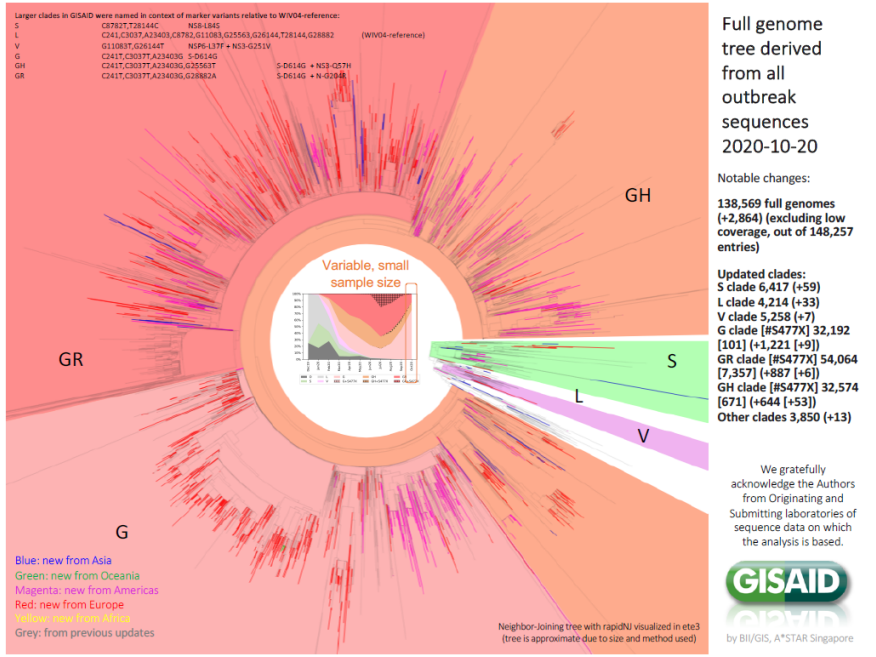
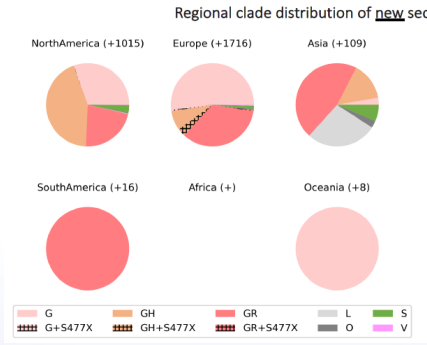
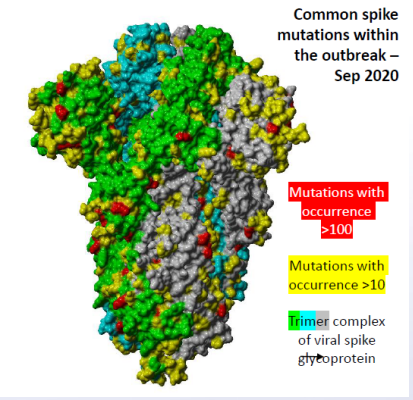
Rapid Sharing of GSD is Critical

- The complete genomes of SARS-CoV-2 were shared via GISAID within 48 hours of being sequenced
- As of 20 Oct, 138,569 full genomes had been up loaded in to GISAID
- This “real-time” data allows a rapid targeted response:
  - Development of first diagnostics kits and continuous refinement through surveillance for mutations
  - Identification of potential drug and vaccine targets on hCOV-19 allowing repurposing
  - Genomic epidemiology of hCOV-19 allows analysis of the spread of the virus from country to country, identification of transmission chains and contact tracing
  - Evidence that the virus has not drifted significantly, continuous monitoring particularly of the cell receptor binding pocket
  - Sequence of viruses which have caused reinfections
  - Identification of animal precursors of hCOV-19 (bats and pangolins)







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Use of GISRS for COVID-19

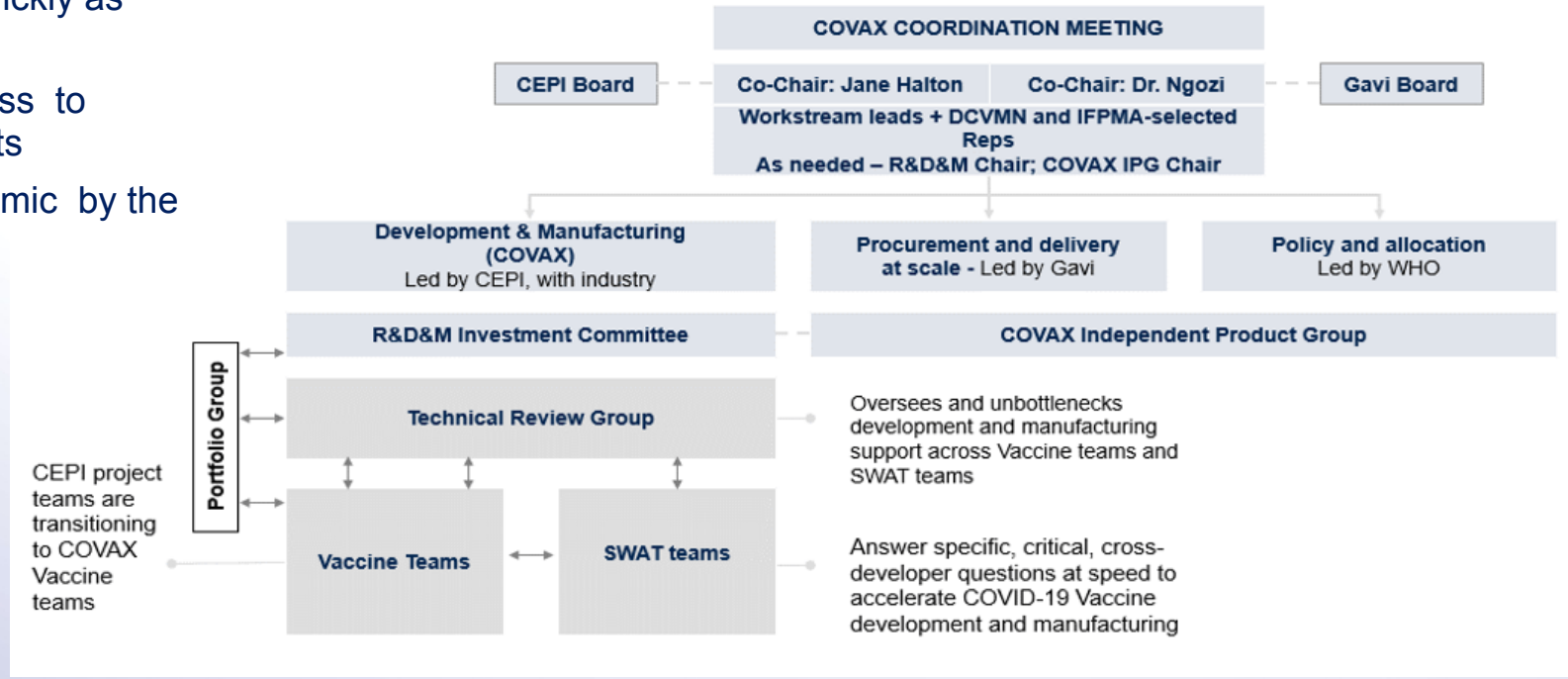
- The capacity and expertise established within the WHO Global Influenza Surveillance and Response System (GISRS) over many decades has been used for COVID-19 response
- Approximately 90% of national COVID-19 labs are National Influenza Centres or labs associated with GISRS
- Through mechanisms established for influenza, GISRS supported the COVID-19 response in several ways, including:
    - COVID-19 sentinel surveillance
    - COVID-19 data reporting
    - Shipping of COVID-19 virus materials
    - Providing COVID-19 serology and early investigation protocols
- Clearly demonstrates the importance of having the capacity / expertise in place prior to a pandemic and the need to collaborate on a global scale

Innovation and Collaboration are Key
COVAX Facility

Goals

- To support the largest actively managed portfolio of vaccine candidates globally
- To deliver 2 billion doses by end of 2021
- To offer a compelling return on investment by delivering COVID-19 vaccines as quickly as possible
- To guarantee fair and equitable access to COVID-19 vaccines for all participants
- To end the acute phase of the pandemic by the end of 2021

ACT-Accelerator /COVAX Facility Governance



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Lessons Learned for improved pandemic response (so far)

Response needs to be truly global and collaboration between all stakeholders is key

- Rapid sharing of GSD is critical - Nagoya Protocol / National ABS legislation must not impede this
- Building expertise and capacity before a pandemic is essential (i.e. surveillance, regulatory, deployment etc.)
- Established seasonal influenza programmes not only significantly reduce influenza-related morbidity and mortality, they also provide the infrastructure to increase preparedness for future pandemics
- Clear policies and communications on vaccinations and priority groups as well as novel approaches to vaccination sites are needed
- Vaccine confidence must be addressed

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Thank you

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