

Table 12: Analytical Technology for the Influenza Vaccines of Today and Tomorrow

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SCOPE:

The first influenza vaccine was developed by Jonas Salk and Thomas Francis in 1938. While the analytical technology can often seem to be circa mid-1900s, new assays are on the horizon for the current and next generation of flu vaccines. Technologies being exploited by biotechnology products (e.g., mAbs, therapeutic proteins, etc.) are well-suited for replacing older analytical technologies used to test flu vaccines. Additionally, the next generation of flu vaccines in development (e.g., nucleic acid vaccines) will take advantage of these new technologies and require new analytical tools to support entirely different manufacturing processes and product designs. Flu vaccine manufacturing is a special challenge because of the need for speed (from WHO strain selection to commercial production), the large volume of testing and short turnaround time for product release, the yearly changing product, and the extra challenge of potential pandemic declarations.

This roundtable will discuss both replacement of analytical technology for current flu vaccines as well as the future of assays for new flu vaccine modalities. The roundtable will be flexible to discuss the topics most relevant to the attendees.

QUESTIONS FOR DISCUSSION:

1. What are the assays most in need of replacement?
2. What are or should be the main drivers for assay replacement?
3. What are the challenges with replacing the existing potency assay (SRID) with a new technology (e.g. IDMS, ELISA, etc.)?
4. What are the new or emerging analytical technologies that could be used?
5. What new analytical challenges are arising with new flu vaccine modalities?
6. Are there new “platform” analytical technologies that may be applied to the diverse and ever-changing flu strains?

DISCUSSION NOTES:

For traditional vaccines, historically there has not been the regulatory push (i.e., from CBER regs) to advance the analytical tools. As we move to subunit vaccines, well-characterized vaccines, and novel vaccine platforms, there is opportunity to introduce modern analytical technologies.

- There is a mantra of this is the way it has always been done
- Method validation and standards are also barriers for adoption of new analytical methods
- Any technology needs sufficient competition to advance and advocacy from industry
- Commercial QC’s ability to adopt new technology and training for colleagues are also barriers
- Invest in training colleagues like you invest in qualifying technology and instruments
- For automation adoption, incorporate the automated systems as another analyst in method validation
- QC can be ready for any new analytical technology if R&D informs QC what is in the pipeline

- There appears to be a gap in the application of prior knowledge, however, DMF-like files are used every year to create submission, for manufacturing processes and analytical methods

For flu vaccines, there is a very limited window of time to implement new technology due to the very streamlined product lifecycle.

At least one company has a very quick (~ 3 minute) CE method (with 2% RSD) to quantitate intact virus particles instead of qPCR, which has much higher RSD (up to 30%).

- CE should be used to replace existing SDS-PAGE methods
- This has potential to transform process development because the analytical tool has adequate precision to inform process development
- Use of “off-the-shelf” assay kits, without further method optimization, will not provide this level of precision. Method development is required.

Proposal – create a vaccine white paper on the ROI for modernization of vaccine production & analytics. This could be achieved through CASSS or related consortia.