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#Canada21
Canada’s Approach to COVID-19 Vaccine Development and Approval

SPIKEVAX™ - Moderna COVID-19 Vaccine

Leslie Madden, BSc, MBA, LLM
Director, Regulatory Affairs, ModernaTx, Inc.
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Moderna COVID-19 Vaccine Timeline

- **Jan 11**: Chinese authorities shared the genetic sequence of the novel coronavirus.
- **Jan 13**: mRNA sequence for Moderna COVID-19 Vaccine against the novel coronavirus finalized.
- **Mar 4**: Investigational New Drug (IND) filed by the NIH; allowed to proceed to begin clinical trials.
- **Mar 16**: First participant Phase 1 study dosed.
- **Mar 29**: IND submitted to FDA for Phase 2 study.
- **Apr 27**: Announcement of first dosing in Phase 2.
- **May 1**: Collaboration announced with Lonza Ltd to manufacture (goal of up to 1B doses per year).
- **May 29**: Phase 3 initiated (~30,000 subjects).
- **Jul 27**: Phase 3 initiated (~30,000 subjects).
- **Oct 12**: Submission of 1st IO to HC.
- **Dec 18**: FDA issues emergency use of Moderna COVID-19 Vaccine.
- **Dec 23**: Health Canada authorizes Moderna COVID-19 Vaccine under Interim Order.


Modern COVID-19 Vaccine: Activity Under the Interim Order (IO)

From Submission Under IO to Notice of Compliance (NOC)

<table>
<thead>
<tr>
<th>#</th>
<th>Activity</th>
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<tbody>
<tr>
<td>115+</td>
<td>eCTD sequences</td>
</tr>
<tr>
<td>7</td>
<td>Updates to the Product Monograph</td>
</tr>
<tr>
<td>3</td>
<td>Health Product Risk Communications (HPRC)</td>
</tr>
<tr>
<td>17</td>
<td>Scheduled teleconferences with Health Canada</td>
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<tr>
<td>+++</td>
<td>Touch-base with BRDD Project Manager</td>
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</tbody>
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= Volume of regulatory activity typical of an innovative drug over 2-3 years

*Compressed into <10 months*

This regulatory activity was possible due to:

- Rapid implementation and adoption of Interim measures
  - Applied to CTAs, new therapies, the NDS-CV framework, etc.
- Deployment of novel regulatory approaches
- High degree of transparency and active communication
  - Including evenings, weekends & holidays!
Experience with Moderna COVID-19 Vaccine

1. Rolling submissions / real-time submission & review of data
   • High degree of transparency
   • All updates filed as Amendments to the IO

2. Condensed regulatory timelines across all activities
   • Clarifax responses
   • DEL / GMP updates
   • Material development / translation
   • Public Release of Clinical Information (PRCI) process

3. Significant CMC activity
   • Supply & scale up for global demand

4. IO-specific labelling criteria
   • Internationally aligned labels; not country-specific
   • Allowed for streamlined global review & supply chain flexibility

5. HC-implemented online resources
   • Vaccines for COVID-19
   • Reported side effects following COVID-19 vaccination in Canada

6. Support from External Partners
   • Innomar Strategies agreement with GoC to support distribution of COVID-19 vaccines across Canada
   • FedEx Express Canada
Case Study 1: US Supply of COVID-19 Vaccine Moderna

Experience with IO Amendment

- Independent supply chains.
- Active manufacturing scale-up to supply 600 million to 1 billion doses per year.

United States

On May 17, 2021, the Biden administration announces that the US will begin export.

At the time, all supply of Moderna vaccine to Canada has been from International supply chain.

Regulatory Considerations
1. New sites require CMC Amendment to IO for HC review + addition to DEL
2. US-specific inner & outer labelling (carton & vial); technical & time limitations make relabeling non-viable
Clear priority: Increase availability of vaccine in Canada

Activity:
- Pre-submission teleconference with HC
- Amendment to IO submitted
- Use of existing HPRC framework
  - Multiple updates to HPRC, similar to Product Monograph management

Outcome:
- HPRC enabled communication of key labelling information in parallel with vaccine inner/outer labelling
Case Study 2: News, Media & Press Releases

Comirnaty? SpikeVax? Health Canada authorizes brand name change for approved COVID-19 vaccines

Lack of understanding of regulatory framework & process has been highlighted during the pandemic

• In the press and on social media

Communication of all activity, even ‘standard’ activity, should be thoughtfully considered

Why did Pfizer, Moderna COVID-19 vaccines get new names after approval? Experts explain

By David Lao • Global News
Posted September 19, 2021 8:00 am

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Interim Order: Lessons Learned

Resourcing, resourcing, resourcing!
- Cross-functional engagement is paramount to manage multiple activities within/across HAs
- Significant demand on regulatory eCTD publishing

Enable flexibility of process
- As the pandemic evolves so does the regulatory activity, e.g. emerging VOCs, heterologous dosing, booster dosing
- Submission plan is important, revision is inevitable & communication is key

News & social media
- Increased visibility of regulatory activity; consider psychological well-being of your teams

Expanded regulatory stakeholders
- PHAC, NACI, CIC

NOC is just one important step in the journey
- Employment of Terms & Conditions
- Significant post-market safety & efficacy collection ongoing
The Future of Regulatory Sciences

Regulatory Modernization
- Rolling submissions
- International cooperation between regulators
- Embracing real-world evidence: enhanced generation, review and incorporation of RWE
- Platform clinical development for mRNA technology

Use of Artificial Intelligence (AI) & Machine Learning
- Manpower was critical to success in a pandemic, but is not sustainable
- Tools to enable rapid review are also required
- Development of regulatory dossiers & management of global queries coordination
- HA use to enable review

Consideration of Social Media and Medical Misinformation
- Need to continue building trust
- Consideration of pathways to enable direct-to-consumer (DTC) disease education & product information
- A global world requires global communication
- Consistent regional messaging just as important