

PRODUCT MONOGRAPH  
INCLUDING PATIENT MEDICATION INFORMATION

**FLUCELVAX®**

Influenza Vaccine (surface antigen, inactivated, prepared in cell cultures)

Suspension for Injection

Active Immunizing Agent for the Prevention of Influenza

ATC Code: J07BB02

2025/2026 strains

|                                                  |                  |
|--------------------------------------------------|------------------|
| A/Wisconsin/67/2022 (H1N1)pdm09-like virus       | 15 micrograms HA |
| A/District of Columbia/27/2023 (H3N2)-like virus | 15 micrograms HA |
| B/Austria/1359417/2021-like virus                | 15 micrograms HA |

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**RECENT MAJOR LABEL CHANGES**

N/A

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Sections or subsections that are not applicable at the time of authorization are not listed.

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## PART I: HEALTH PROFESSIONAL INFORMATION

### 1 INDICATIONS

FLUCELVAX® is a trivalent inactivated vaccine indicated for active immunization of adults and children aged 6 months or older for the prevention of influenza disease caused by influenza virus subtypes A and type B contained in the vaccine.

The National Advisory Committee on Immunization (NACI) provides additional guidance on the use of the influenza vaccine in Canada. Please refer to the published Statement on Seasonal Influenza Vaccine for the current season.

#### 1.1 Pediatrics

**Pediatrics (6 months to < 18 years):** Based on the data submitted and reviewed by Health Canada, the safety and efficacy of FLUCELVAX® in pediatric patients has been established; therefore, Health Canada has authorized an indication for use in the pediatric population 6 months of age and older (see 8.2.1 Clinical Trial Adverse Reactions - pediatrics and 14 CLINICAL TRIALS).

### 2 CONTRAINDICATIONS

FLUCELVAX® is contraindicated in patients who are hypersensitive to this drug or to any ingredient in the formulation, including any non-medicinal ingredient, or component of the container. For a complete listing, see 6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING.

### 4 DOSAGE AND ADMINISTRATION

#### 4.2 Recommended Dose

The recommended dosage schedule for FLUCELVAX® is presented in Table 1.

**Table 1: FLUCELVAX® Recommended Dosage, by Age Group**

| Age Group             | Dose                                 | Schedule                                      |
|-----------------------|--------------------------------------|-----------------------------------------------|
| 6 months to < 9 years | One or two <sup>a</sup> 0.5 mL doses | If 2 doses, administer at least 4 weeks apart |
| ≥ 9 years             | One 0.5 mL dose                      | Not applicable                                |

<sup>a</sup> Children less than 9 years of age who have not been previously vaccinated against influenza, should receive a second dose

#### 4.4 Administration

The vaccine should be administered by intramuscular injection. The preferred site for intramuscular injection in older children and adults is the deltoid muscle of the upper arm. Younger children with insufficient deltoid mass should be vaccinated in the anterolateral aspect of the thigh.

Shake before use. After shaking, the normal appearance of the vaccine is a clear to slightly opalescent suspension.

Visually inspect the contents of each multi-dose vial or pre-filled syringe for particulate matter and/or variation in appearance prior to administration. If either condition exists, do not administer the vaccine.

FLUCELVAX® must not be mixed with other products.

Multi-Dose Vial

Between uses, return the multi-dose vial to the recommended storage conditions.

Please refer to the Canadian Immunization Guide, Public Health Agency of Canada, for general information regarding vaccine administration practices.

**5 OVERDOSAGE**

There is no experience of overdose with FLUCELVAX®.

For management of a suspected drug overdose, contact your regional poison control centre.

**6 DOSAGE FORMS, STRENGTHS, COMPOSITION AND PACKAGING**

To help ensure the traceability of vaccines for patient immunization record-keeping as well as safety monitoring, health professionals should record the time and date of administration, quantity of administered dose (if applicable), anatomical site and route of administration, brand name and generic name of the vaccine, the product lot number and expiry date.

**Table 2: Dosage Forms, Strengths, Composition and Packaging**

| Route of Administration | Dosage Form / Strength/Composition                                                                                                      | Non-medicinal Ingredients                                                                                                                                                                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intramuscular Injection | Pre-filled syringe/ Multi-dose vials<br><br>Each 0.5 mL contains 15 mcg haemagglutinin (HA) of each influenza virus strain listed below | <u>Excipients:</u><br>disodium phosphate dihydrate, magnesium chloride hexahydrate, potassium chloride, potassium dihydrogen phosphate, sodium chloride, thimerosal*, water for injections<br><br><u>Residuals:</u><br>beta-propiolactone, cetyltrimethylammonium bromide, polysorbate 80 |

\*Multi-dose vials only

For the 2025/2026 Northern Hemisphere Influenza Season, FLUCELVAX® contains the following strains:

A/Wisconsin/67/2022 (H1N1)pdm09-like virus (A/Georgia/12/2022 CVR-167)  
A/District of Columbia/27/2023 (H3N2)-like virus (A/Victoria/800/2024 CVR-289)  
B/Austria/1359417/2021-like virus (B/Singapore/WUH4618/2021)

As recommended annually by the World Health Organization (WHO) and the National Advisory

Committee on Immunization (NACI).

### **Packaging**

FLUCELVAX® suspension for injection is supplied in two presentations:

- 0.5 mL suspension in needle-free pre-filled syringes (type I glass), with a plunger stopper (bromobutyl rubber) (needles not supplied)
- 5.0 mL multi-dose vial (type 1 glass), with rubber (bromobutyl) stopper

FLUCELVAX® 0.5 mL pre-filled syringes contain no preservative or antibiotics.

FLUCELVAX® 5 mL multi-dose vial formulation contains thimerosal, a mercury derivative, added as a preservative. Each 0.5 mL dose from the multi-dose vial contains 25 mcg mercury. FLUCELVAX® 5 mL multi-dose vial formulation contains no antibiotics.

The tip caps and plungers of the pre-filled syringes and the multi-dose vial stopper are not made with natural rubber latex.

Both presentations of FLUCELVAX® are considered safe for use in persons with latex allergies.

## **7 WARNINGS AND PRECAUTIONS**

### **General**

As with all injectable vaccines, appropriate medical treatment and supervision should always be readily available in case of a rare anaphylactic event following the administration of the vaccine.

Syncope (fainting) can occur following, or even before, any vaccination as a psychogenic response to the needle injection. This can be accompanied by several neurological signs such as transient visual disturbance, paraesthesia and tonic-clonic limb movements during recovery. It is important that procedures are in place to avoid injury from faints.

Immunization should be postponed in patients with febrile illness until the fever is resolved.

A protective immune response may not be elicited in all vaccine recipients.

### **Hematologic**

As with other intramuscular injections, administration of FLUCELVAX® requires careful consideration in patients with clinically significant bleeding disorders.

### **Immune**

Antibody response in patients with endogenous or iatrogenic immunosuppression may be insufficient.

### **Neurologic**

If Guillain-Barré syndrome has occurred within 6 weeks of receipt of prior influenza vaccine, the decision to give FLUCELVAX® should be based on careful consideration of the potential benefits and risks.

### **Reproductive Health: Female and Male Potential**

#### **• Fertility**

A reproductive and developmental toxicity study in female rabbits with FLUCELVAX® revealed no impairment of fertility.

## 7.1 Special Populations

### 7.1.1 Pregnant Women

Healthcare providers should assess the benefit and potential risks of administering the vaccine to pregnant women taking into consideration official recommendations.

Data for FLUCELVAX® QUAD are relevant to FLUCELVAX® because both vaccines are manufactured using the same process and have overlapping compositions.

The safety of FLUCELVAX® in pregnancy has not been assessed in randomised clinical trials. Data from a prospective Pregnancy Exposure Registry in the United States (US) were collected from women vaccinated with FLUCELVAX® QUAD during 3 Northern Hemisphere influenza seasons (2017-18 through 2019-20), of whom 28% were exposed during their 1st trimester. Based on pregnancy outcomes and predefined infant safety outcomes, there was no evidence of adverse fetal, newborn or pregnancy outcomes attributable to the vaccine during any stage of pregnancy. Of 665 exposed pregnancies, 659 resulted in live births, with 667 infants born. There were no stillbirths. Prevalence rates for infant outcomes were for low birth weight (5.8%), for preterm birth (9.2%) and for major congenital malformations (1.9%). Rates reported in the US for similar infant outcomes were of 8.3%<sup>1</sup>, 10.2%<sup>2</sup> and 2.8%<sup>3</sup>, respectively.

### 7.1.2 Breast-feeding

FLUCELVAX® has not been evaluated in nursing mothers.

It is unknown if FLUCELVAX® is excreted in human milk. Precaution should be exercised because many drugs can be excreted in human milk.

### 7.1.3 Pediatrics

**Pediatrics (< 6 months):** No data are available to Health Canada; therefore, Health Canada has not authorized an indication for use in children less than 6 months of age.

## 8 ADVERSE REACTIONS

### 8.1 Adverse Reaction Overview

Data for FLUCELVAX® QUAD are relevant to FLUCELVAX® because both vaccines are manufactured using the same process and have overlapping compositions.

Adverse event information is derived from clinical trials and worldwide post-marketing experience with FLUCELVAX®.

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<sup>1</sup> Martin JA, Hamilton BE, Osterman M, Driscoll AK. Births: Final data for 2018. Natl Vital Stat Rep. 27 Nov 2019;68(13):1-47.

<sup>2</sup> Martin 2020 (Martin JA, Hamilton BE, Osterman M. Births in the United States, 2019. NCHS Data Brief. Oct 2020;387:1-8.)

<sup>3</sup> Correa A, Cragan J, Kucik J, et al. Metropolitan Atlanta Congenital Defects Program 40th anniversary edition surveillance report: Reporting birth defects surveillance data 1968- 2003. Birth Defects Res A. 2007;79:65-93.

## 8.2 Clinical Trial Adverse Reactions - adults

Because clinical trials are conducted under very specific conditions, the adverse reaction rates observed in the clinical trials may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse reaction information from clinical trials is useful for identifying drug-related adverse events and for approximating rates.

Safety in adults 18 years and older was evaluated in two studies (Studies 1 and 2). The safety population included a total of 11,376 adults 18 to less than 50 years of age in Study 1 and 2680 adults 18 years of age and older in Study 2: 1340 adults 18 to less than 65 years of age and 1340 adults 65 years of age and older.

Study 1 was a randomized, double-blind, placebo-controlled study conducted in the US, Finland and Poland that evaluated three vaccines: FLUCELVAX® (N=3813), placebo (N=3894) and another trivalent influenza vaccine, Agriflu, (N=3669). Solicited local injection site and systemic adverse reactions were collected from subjects who completed a symptom diary card for 7 days following vaccination.

Solicited adverse reactions in the safety population of adults 18 to less than 50 years who received FLUCELVAX® or placebo are shown in Table 3. Overall, the most common ( $\geq 10\%$ ) local and systemic reactions in adults 18 to less than 50 years of age were injection site pain (30%), headache (15%), injection site erythema (13%), myalgia (12%) and fatigue (10%).

**Table 3: Incidence of Solicited Adverse Reactions in the Adult Safety Population<sup>1</sup> Reported Within 7 Days of Vaccination (Study 1)**

|                                   | Adults 18 through 49 Years                                                 |                                |
|-----------------------------------|----------------------------------------------------------------------------|--------------------------------|
|                                   | Percentages of Subjects with Any (Severe) Solicited Reactions <sup>2</sup> |                                |
|                                   | FLUCELVAX®<br>N=3813                                                       | Placebo <sup>3</sup><br>N=3894 |
| <b>Local adverse reactions</b>    |                                                                            |                                |
| Injection site pain               | 30 (<1)                                                                    | 10 (<1)                        |
| Erythema                          | 13 (0)                                                                     | 10 (<1)                        |
| Induration                        | 6 (0)                                                                      | 3 (0)                          |
| Swelling                          | 6 (0)                                                                      | 3 (0)                          |
| Ecchymosis                        | 4 (0)                                                                      | 4 (0)                          |
| <b>Systemic adverse reactions</b> |                                                                            |                                |
| Headache                          | 15 (1)                                                                     | 15 (1)                         |
| Fatigue                           | 10 (1)                                                                     | 10 (1)                         |
| Myalgia                           | 12 (<1)                                                                    | 7 (<1)                         |
| Malaise                           | 8 (<1)                                                                     | 6 (1)                          |
| Chills                            | 6 (<1)                                                                     | 6 (<1)                         |
| Arthralgia                        | 3 (<1)                                                                     | 3 (<1)                         |
| Sweating                          | 3 (<1)                                                                     | 3 (<1)                         |
| Fever ( $\geq 38^{\circ}$ C)      | 1 (0)                                                                      | <1 (0)                         |

<sup>1</sup> Safety population: all subjects in the exposed population who provided post vaccination safety data.

<sup>2</sup> Percentage of severe adverse reactions are presented in parenthesis

<sup>3</sup> Placebo: 0.5 mL Phosphate Buffered Saline

Definition of severe reactions: Erythema, Induration and Ecchymosis:  $>100$  mm; Injection site pain, Headache, Fatigue, Myalgia, Malaise, Chills, Arthralgia, Sweating: unable to perform daily activities; Fever: Oral temperature  $\geq 40.5^{\circ}$  C

Unsolicited adverse events (AEs) were collected for 21 days after vaccination. Comparable percentages

of unsolicited events were reported in subjects in the FLUCELVAX® and placebo groups, (3% in both groups).

Serious adverse events (SAEs) were collected throughout the study duration (until 6 months after vaccination). Comparable percentages of SAEs were reported in subjects in the FLUCELVAX® and placebo groups (<1% in both groups). No SAE was assessed as being related to study vaccines.

Study 2 was a randomized, double-blind, controlled study conducted in the US in which subjects received FLUCELVAX® QUAD (N=1334) or one of the two formulations of comparator trivalent influenza vaccine with either the same composition as FLUCELVAX (TIV1c, N=677) or an alternate B strain (TIV2c, N=669). Solicited local injection site and systemic adverse reactions were collected from subjects who completed a symptom diary card for 7 days following vaccination. Similar rates of solicited local and systemic adverse reactions were reported in subjects who received FLUCELVAX® QUAD or the trivalent comparators in this clinical study.

Solicited adverse reactions in the safety population of adults 18 to less than 65 years of age and 65 years of age and older are shown in Table 4. Overall, the most common ( $\geq 10\%$ ) local and systemic reactions in adults 18 to less than 65 years of age who received either the quadrivalent or trivalent formulations were injection site pain (45%), headache (19%), fatigue (22%), myalgia (15%), injection site erythema (13%), induration (12%) and nausea (10%). The most common ( $\geq 10\%$ ) local and systemic reactions in adults 65 years of age and older were injection site pain (22%), injection site erythema (12%) and fatigue (11%).

**Table 4: Incidence of Solicited Adverse Reactions<sup>1</sup> in the Adult and Elderly Safety Population<sup>2</sup> Reported Within 7 Days of Vaccination (Study 2)**

|                                   | Percentages of Subjects with Any (Severe) Solicited Reactions <sup>3</sup> |                             |                             |                             |                             |                             |
|-----------------------------------|----------------------------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                                   | 18 to less than 65 years of age                                            |                             |                             | $\geq 65$ years of age      |                             |                             |
|                                   | FLUCELVAX®<br>QUAD<br>N=663                                                | Trivalent Influenza Vaccine |                             | FLUCELVAX®<br>QUAD<br>N=656 | Trivalent Influenza Vaccine |                             |
|                                   |                                                                            | TIV1c <sup>4</sup><br>N=330 | TIV2c <sup>4</sup><br>N=327 |                             | TIV1c <sup>4</sup><br>N=340 | TIV2c <sup>4</sup><br>N=336 |
| <b>Local Adverse Reactions</b>    |                                                                            |                             |                             |                             |                             |                             |
| Injection site pain               | 45 (<1)                                                                    | 37 (<1)                     | 41 (0)                      | 22 (0)                      | 19 (0)                      | 19 (0)                      |
| Injection site erythema           | 13 (0)                                                                     | 13 (0)                      | 10 (0)                      | 12 (0)                      | 11 (0)                      | 10 (0)                      |
| Injection site induration         | 12 (0)                                                                     | 10 (<1)                     | 10 (0)                      | 9 (0)                       | 7 (0)                       | 8 (0)                       |
| Injection site ecchymosis         | 4 (0)                                                                      | 3 (<1)                      | 5 (0)                       | 5 (0)                       | 4 (0)                       | 5 (0)                       |
| <b>Systemic Adverse Reactions</b> |                                                                            |                             |                             |                             |                             |                             |
| Headache                          | 19 (<1)                                                                    | 19 (<1)                     | 19 (<1)                     | 9 (<1)                      | 9 (<1)                      | 8 (<1)                      |
| Fatigue                           | 18 (<1)                                                                    | 22 (<1)                     | 16 (2)                      | 9 (<1)                      | 11 (<1)                     | 9 (<1)                      |
| Myalgia                           | 15 (<1)                                                                    | 15 (<1)                     | 15 (1)                      | 8 (<1)                      | 9 (<1)                      | 8 (<1)                      |
| Nausea                            | 10 (<1)                                                                    | 7 (<1)                      | 9 (1)                       | 4 (<1)                      | 4 (0)                       | 4 (<1)                      |
| Arthralgia                        | 8 (<1)                                                                     | 8 (0)                       | 10 (<1)                     | 6 (<1)                      | 5 (<1)                      | 7 (<1)                      |
| Loss of appetite                  | 8 (<1)                                                                     | 9 (<1)                      | 8 (<1)                      | 4 (<1)                      | 5 (0)                       | 4 (<1)                      |

|                           | Percentages of Subjects with Any (Severe) Solicited Reactions <sup>3</sup> |                             |                             |                             |                             |                             |
|---------------------------|----------------------------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                           | 18 to less than 65 years of age                                            |                             |                             | ≥ 65 years of age           |                             |                             |
|                           | FLUCELVAX®<br>QUAD<br>N=663                                                | Trivalent Influenza Vaccine |                             | FLUCELVAX®<br>QUAD<br>N=656 | Trivalent Influenza Vaccine |                             |
|                           |                                                                            | TIV1c <sup>4</sup><br>N=330 | TIV2c <sup>4</sup><br>N=327 |                             | TIV1c <sup>4</sup><br>N=340 | TIV2c <sup>4</sup><br>N=336 |
| Diarrhea                  | 7 (<1)                                                                     | 8 (0)                       | 8 (<1)                      | 4 (<1)                      | 5 (<1)                      | 5 (<1)                      |
| Chills                    | 6 (<1)                                                                     | 6 (<1)                      | 6 (0)                       | 4 (<1)                      | 4 (<1)                      | 5 (<1)                      |
| Vomiting                  | 3 (0)                                                                      | 2 (<1)                      | <1(0)                       | <1 (<1)                     | <1 (0)                      | <1 (0)                      |
| Fever: ≥38.0 °C (≥40.0°C) | <1 (0)                                                                     | <1 (0)                      | <1 (0)                      | <1 (0)                      | <1 (0)                      | <1 (0)                      |

<sup>1</sup> All solicited local and systemic adverse events reported within 7 days of vaccination are included.

<sup>2</sup> Safety population: all subjects in the exposed population who provided post-vaccination safety data.

<sup>3</sup> Percentage of severe adverse reactions are presented in parenthesis.

Definition of severe reactions: Erythema, Induration and Ecchymosis: >100 mm; Pain, Chills, Nausea, Myalgia, Arthralgia, Headache, Fatigue, Loss of appetite; unable to perform daily activity, Vomiting: requires outpatient hydration; Diarrhea: 6 or more stools or requires outpatient IV hydration.

<sup>4</sup> TIV1c contained two A strains and a B/Victoria strain; TIV2c contained two A strains and a B/Yamagata strain.

Unsolicited adverse events (AEs) were collected for 21 days after vaccination. Comparable percentages of unsolicited events were reported in subjects in the FLUCELVAX® QUAD, TIV1c and TIV2c groups, (16.1%, 14.7% and 16.5% respectively).

Serious adverse events (SAEs) were collected throughout the study duration (until 6 months after vaccination). Comparable percentages of SAEs were reported in subjects in the FLUCELVAX® QUAD, TIV1c and TIV2c groups, (3.9%, 3.3% and 3.2% respectively). No SAE was assessed as being related to study vaccines.

## 8.2.1 Clinical Trial Adverse Reactions - pediatrics

### Children 6 months to less than 18 years of age

Safety in children 6 months to less than 18 years of age has been evaluated in 3 clinical studies, V130\_03 (Study 3), V130\_12 (Study 4) and V130\_10 (Study 5).

Study 3 was a randomized, double-blind, controlled study conducted in the U.S. The safety population included a total of 2332 children 4 to less than 18 years of age; 1161 children 4 to less than 9 years of age and 1171 children 9 to less than 18 years of age.

In this study, subjects 9 to less than 18 years received a single dose of FLUCELVAX® QUAD (N=1159) or one of the two formulations of comparator trivalent influenza vaccine with either the same composition as FLUCELVAX® (TIV1c, N=593) or an alternate B strain (TIV2c, N=580).

Solicited local injection site and systemic adverse reactions were collected from subjects who completed a symptom diary card for 7 days following vaccination. Solicited adverse reactions in the safety population of children 9 years to less than 18 years of age are shown in Table 5. Similar rates of solicited local and systemic adverse reactions were reported in subjects who received FLUCELVAX® QUAD or the trivalent comparators in this clinical study.

The most common (≥10%) local and systemic adverse reactions in children and adolescents 9 to less than 18 years of age who received either the quadrivalent or trivalent formulations were pain at the

injection site (58%), headache (23%), injection site erythema (19%), fatigue (18%), myalgia (17%) and injection site induration (15%).

**Table 5: Incidence of Solicited Adverse Reactions<sup>1</sup> in the Safety Population<sup>2</sup> of Children 9 to less than 18 years of age Reported After Any Dose Within 7 Days of Vaccination (Study 3)**

|                            | Percentages of Subjects with Any (Severe) Solicited Reactions <sup>3</sup> |                             |                                              |
|----------------------------|----------------------------------------------------------------------------|-----------------------------|----------------------------------------------|
|                            | Children 9 to <18 years                                                    |                             |                                              |
|                            | FLUCELVAX®<br>QUAD<br>N=579                                                | Trivalent Influenza Vaccine |                                              |
|                            |                                                                            | TIV1c <sup>5</sup><br>N=294 | TIV2c <sup>5</sup><br>N=281-282 <sup>4</sup> |
| Local Adverse Reactions    |                                                                            |                             |                                              |
| Injection site pain        | 58 (1)                                                                     | 51 (<1)                     | 50 (0)                                       |
| Injection site erythema    | 19 (< 1)                                                                   | 17(0)                       | 15 (< 1)                                     |
| Injection site induration  | 15 (0)                                                                     | 15 (0)                      | 13 (< 1)                                     |
| Injection site ecchymosis  | 4 (0)                                                                      | 5 (0)                       | 5 (0)                                        |
| Systemic Adverse Reactions |                                                                            |                             |                                              |
| Headache                   | 22 (1)                                                                     | 23 (2)                      | 18 (1)                                       |
| Fatigue                    | 18 (< 1)                                                                   | 16 (1)                      | 16 (< 1)                                     |
| Myalgia                    | 16 (< 1)                                                                   | 17(< 1)                     | 15 (< 1)                                     |
| Loss of appetite           | 9 (0)                                                                      | 9 (< 1)                     | 9 (0)                                        |
| Nausea                     | 9 (< 1)                                                                    | 8 (1)                       | 7 (1)                                        |
| Fever: ≥38.0 °C (≥40.0 °C) | 1 (< 1)                                                                    | 3 (0)                       | 1 (0)                                        |
| Arthralgia                 | 6 (0)                                                                      | 6 (0)                       | 8 (< 1)                                      |
| Vomiting                   | 2 (0)                                                                      | 1 (0)                       | 2 (0)                                        |
| Diarrhea                   | 4 (0)                                                                      | 4 (0)                       | 3 (< 1)                                      |
| Chills                     | 7 (0)                                                                      | 6 (1)                       | 4 (1)                                        |

<sup>1</sup> All solicited local and systemic adverse events reported within 7 days of vaccination are included.

<sup>2</sup> Safety population: all subjects in the exposed population who provided post-vaccination safety data.

<sup>3</sup> Percentage of severe adverse reactions are presented in parenthesis.

Definition of severe reactions: Erythema, Induration and Ecchymosis: Severe= >100 mm; Pain and systemic adverse reactions: Severe = unable to perform daily activity.

<sup>4</sup> 281 subjects provided data for Injection site ecchymosis.

<sup>5</sup> TIV1c contained two A strains and a B/Victoria strain; TIV2c contained two A strains and a B/Yamagata strain.

Unsolicited adverse events were collected for 21 days after last vaccination. Comparable percentages of unsolicited events were reported in children 9 through 17 years of age in the FLUCELVAX® QUAD, TIV1c and TIV2c groups, (37.2%, 36.7% and 39.8% respectively).

Serious adverse events (SAEs) were collected throughout the study duration (until 6 months after last vaccination). Comparable percentages of SAEs were reported in children 9 through 17 years of age in the FLUCELVAX® QUAD, TIV1c and TIV2c groups, (0.9%, 1.3% and 0% respectively). No SAE was assessed as being related to study vaccines.

Study 4 (V130\_12) was a multi-season, multi-national, randomized, observer-blind study in children 2 to less than 18 years of age. The solicited safety population included a total of 4509 children who received FLUCELVAX® QUAD (N=2255) or a non-influenza vaccine comparator vaccine (N=2254). In this study, children 2 to less than 9 years of age received one or two doses (separated by 4 weeks) of

FLUCELVAX® QUAD or comparator vaccine depending on the subject's prior influenza vaccination history. Children 9 to less than 18 years received a single dose of FLUCELVAX® QUAD or comparator vaccine.

In this study, solicited local injection site and systemic adverse reactions were collected from subjects who completed a symptom diary card for 7 days following vaccination.

In children 2 to less than 18 years of age who received FLUCELVAX® QUAD, the incidence of local and systemic solicited adverse reactions was similar to or less than those reported in Study 3.

The most common ( $\geq 10\%$ ) local and systemic adverse reactions in children 2 to less than 6 years of age were injection site tenderness (29%), injection site erythema (20%), sleepiness (15%), irritability (14%) and injection site induration (14%).

The most common ( $\geq 10\%$ ) local and systemic adverse reactions in children 6 to less than 9 years of age were injection site pain (28%), injection site erythema (22%), injection site induration (16%), fatigue (14%), headache (14%), injection site ecchymosis (11%) and loss of appetite (11%).

The most common ( $\geq 10\%$ ) local and systemic adverse reactions in children and adolescents 9 to less than 18 years of age were injection site pain (22%), headache (18%), injection site erythema (17%), fatigue (17%) and injection site induration (11%).

In Study 4, in children who received two doses, the rates of solicited local and systemic adverse reactions was generally lower after the second dose compared to the first dose.

The incidence of local and systemic solicited adverse reactions in children 2 to less than 18 years of age who received FLUCELVAX® QUAD and comparator are summarized in Table 6.

**Table 6: Incidence of Solicited Adverse Reactions in the Safety Population<sup>1</sup> (2 to less than 18 years of age) Reported After Any Dose Within 7 Days of Vaccination (Study 4)**

|                                   | Percentages of Subjects with Any (Severe) Solicited Reactions <sup>2</sup> |                                  |                             |                                  |                              |                                   |
|-----------------------------------|----------------------------------------------------------------------------|----------------------------------|-----------------------------|----------------------------------|------------------------------|-----------------------------------|
|                                   | Children 2 to < 6 years                                                    |                                  | Children 6 to <9 years      |                                  | Children 9 to <18 years      |                                   |
|                                   | FLUCELVAX®<br>QUAD<br>N=580                                                | Comparator <sup>3</sup><br>N=565 | FLUCELVAX®<br>QUAD<br>N=564 | Comparator <sup>3</sup><br>N=578 | FLUCELVAX®<br>QUAD<br>N=1111 | Comparator <sup>3</sup><br>N=1111 |
| <b>Local Adverse Reactions</b>    |                                                                            |                                  |                             |                                  |                              |                                   |
| Injection site pain/Tenderness    | 28.7 (1.0)                                                                 | 25.4 (1.4)                       | 27.9 (1.2)                  | 20.3 (1.6)                       | 21.7 (0.5)                   | 18.3 (1.0)                        |
| Injection site erythema           | 20.2 (0.3)                                                                 | 24.5 (1.8)                       | 22.4 (0.4)                  | 22.8 (0.3)                       | 17.2 (0)                     | 18.7 (0.5)                        |
| Injection site induration         | 13.5 (0.2)                                                                 | 13.9 (0.7)                       | 16.3 (0.2)                  | 16.5 (0.2)                       | 10.5 (0.1)                   | 11 (0.2)                          |
| Injection site ecchymosis         | 9.2 (0)                                                                    | 6.9 (0)                          | 10.9 (0)                    | 8.0 (0.2)                        | 5.0 (0)                      | 5.2 (0)                           |
| <b>Systemic Adverse Reactions</b> |                                                                            |                                  |                             |                                  |                              |                                   |
| Sleepiness                        | 14.9 (0.9)                                                                 | 17.6 (1.8)                       | -                           | -                                | -                            | -                                 |
| Irritability                      | 13.8 (0.2)                                                                 | 10.8 (0.5)                       | -                           | -                                | -                            | -                                 |
| Fatigue                           | -                                                                          | -                                | 13.8 (0.9)                  | 12.7 (0.7)                       | 17 (1.1)                     | 18.2 (1.2)                        |
| Headache                          | -                                                                          | -                                | 13.8 (0.4)                  | 11.8 (0.5)                       | 18.1 (1.4)                   | 17.4 (0.6)                        |
| Loss of appetite                  | -                                                                          | -                                | 10.6 (0.5)                  | 8.0 (0.5)                        | 8.5 (0.5)                    | 7.5 (0.5)                         |
| Change of eating habits           | 9.9 (1.0)                                                                  | 10.1 (0.7)                       | -                           | -                                | -                            | -                                 |

|                               | Percentages of Subjects with Any (Severe) Solicited Reactions <sup>2</sup> |                                  |                             |                                  |                              |                                   |
|-------------------------------|----------------------------------------------------------------------------|----------------------------------|-----------------------------|----------------------------------|------------------------------|-----------------------------------|
|                               | Children 2 to < 6 years                                                    |                                  | Children 6 to <9 years      |                                  | Children 9 to <18 years      |                                   |
|                               | FLUCELVAX®<br>QUAD<br>N=580                                                | Comparator <sup>3</sup><br>N=565 | FLUCELVAX®<br>QUAD<br>N=564 | Comparator <sup>3</sup><br>N=578 | FLUCELVAX®<br>QUAD<br>N=1111 | Comparator <sup>3</sup><br>N=1111 |
| Fever: ≥38.0 °C<br>(≥40.0 °C) | 8.8 (0.5)                                                                  | 7.7 (0.4)                        | 6.4 (0.5)                   | 4.5 (0)                          | 2.8 (0.1)                    | 3.0 (0.3)                         |
| Diarrhoea                     | 8.3 (0.5)                                                                  | 8.5 (0.9)                        | 4.6 (0.4)                   | 5.2 (0.3)                        | 7.4 (0.5)                    | 8.1 (0.3)                         |
| Arthralgia                    | -                                                                          | -                                | 5.2 (0.4)                   | 6.2 (0.3)                        | 7.1 (0.4)                    | 8.4 (0.5)                         |
| Nausea                        | -                                                                          | -                                | 5.2 (0)                     | 4.5 (0.7)                        | 6.0 (0.2)                    | 6.1 (0.6)                         |
| Vomiting                      | 4.8 (0.5)                                                                  | 4.1 (0.7)                        | 5.0 (0.7)                   | 4.2 (0.5)                        | 3.0 (0.3)                    | 3.0 (0.4)                         |
| Chills/Shivering              | 4.7 (0.7)                                                                  | 3.9 (0.4)                        | 6.1 (0.5)                   | 3.8 (0.3)                        | 7.6 (0.4)                    | 7.6 (0.3)                         |
| Myalgia                       | -                                                                          | -                                | 2.9 (0.2)                   | 4.0 (0.3)                        | 6.1 (0.5)                    | 5.5 (0.5)                         |

<sup>1</sup> Solicited Safety Population: subjects who were vaccinated and provided any solicited local or systemic adverse event safety data, from 6 hours through 7 days after vaccination

<sup>2</sup> Percentage of subjects with severe adverse reactions are presented in parenthesis.

<sup>3</sup> Non-influenza vaccine comparator

Definitions of severe reactions (subjects 2 to < 6 years of age): Erythema, Induration and Ecchymosis: > 50 mm; Tenderness and Shivering: prevents daily activity; Change of eating habits: Missed more than 2 feeds/meals; Sleepiness: Sleeps most of the time and is hard to arouse him/her; Vomiting: 6 or more times in 24 hours or requires intravenous hydration; Diarrhea: 6 or more loose stools in 24 hours or requires intravenous hydration; Irritability: unable to console.

Definitions of severe reactions (subjects 6 to < 18 years of age): Erythema, Induration and Ecchymosis: > 100 mm; Loss of appetite: Not eating at all; Vomiting: 6 or more times in 24 hours or requires intravenous hydration; Diarrhea: 6 or more loose stools in 24 hours or requires intravenous hydration; Pain, Nausea, Fatigue, Myalgia, Arthralgia, Headache and Chills: prevents daily activity

"-" denotes reaction was not solicited in this age group

Study 3: NCT03165617

All unsolicited adverse events were collected for 21 days after last vaccination. Comparable percentages of unsolicited events were reported in children 2 to less than 18 years of age in the FLUCELVAX® QUAD and non-influenza comparator vaccine groups, (28.0% and 27.9%, respectively).

Serious adverse events (SAEs) were collected throughout the study duration (until 6 months after last vaccination). Comparable percentages of SAEs were reported in children 2 to less than 18 years of age in the FLUCELVAX® QUAD and non-influenza comparator vaccine groups (1.1 and 1.3% respectively). No SAE was assessed as being related to study vaccine.

Study 5 (V130\_10) was a randomized, observer-blind, multicenter study in children 6 months to less than 4 years of age. The safety population included a total of 2402 children 6 months to less than 4 years of age who received FLUCELVAX® QUAD (N=1597) or a US-licensed quadrivalent influenza vaccine (QIV) comparator (N=805). Study subjects received one or two doses (separated by 4 weeks) of FLUCELVAX® QUAD or the comparator vaccine depending on the subject's prior influenza vaccination history.

Solicited local injection site and systemic adverse reactions were collected from subjects who completed a symptom diary card for 7 days following vaccination. The solicited safety set consisted of 2348 subjects who received FLUCELVAX® QUAD (N=1564) or a US-licensed quadrivalent influenza vaccine comparator (N=784).

Solicited adverse reactions in the safety population are shown in Table 7.

The most common ( $\geq 10\%$ ) local and systemic adverse reactions in children 6 months to less than 4 years of age were injection site tenderness (28%), irritability (28%), sleepiness (27%), injection site erythema (26%), diarrhea (18%), change of eating habits (17%), injection site induration (17%) and injection site ecchymosis (11%).

In children who received two doses, the rates of solicited local and systemic adverse reactions was generally similar or lower after the second dose compared to the first dose.

**Table 7: Incidence of Solicited Local and Systemic Adverse Reactions<sup>1</sup> in the Safety Population<sup>2</sup> (Children 6 months to less than 4 years of age) Reported After Any Dose Within 7 Days of Vaccination (Study 5)**

| Percentages of Subjects with Any (Severe) Solicited Reactions <sup>3</sup> |                             |                     |                             |                     |
|----------------------------------------------------------------------------|-----------------------------|---------------------|-----------------------------|---------------------|
|                                                                            | Children 6 to <24 months    |                     | Children 24 to <48 months   |                     |
|                                                                            | FLUCELVAX®<br>QUAD<br>N=581 | Comparator<br>N=292 | FLUCELVAX®<br>QUAD<br>N=983 | Comparator<br>N=492 |
| <b>Local Adverse Reactions</b>                                             |                             |                     |                             |                     |
| Injection site tenderness                                                  | 25.5 (2.1)                  | 23.3 (1.4)          | 29.3 (2.2)                  | 33.9 (1.4)          |
| Injection site erythema                                                    | 25.3 (0)                    | 18.2 (0)            | 26.0 (0.7)                  | 28.5 (0)            |
| Injection site induration                                                  | 16.5 (0.5)                  | 12.0 (0)            | 17.7 (0.3)                  | 18.3 (0)            |
| Injection site ecchymosis                                                  | 11.2 (0.2)                  | 7.5 (0)             | 10.5 (0.1)                  | 12.8 (0)            |
| <b>Systemic Adverse Reactions</b>                                          |                             |                     |                             |                     |
| Irritability                                                               | 35.1 (5.2)                  | 35.6 (2.1)          | 23.6 (1.8)                  | 26.0 (3.0)          |
| Sleepiness                                                                 | 35.5 (2.4)                  | 30.5 (1.7)          | 21.8 (1.9)                  | 22.6 (1.2)          |
| Diarrhea                                                                   | 23.2 (2.4)                  | 20.2 (0.7)          | 14.8 (1.1)                  | 14.0 (1.2)          |
| Change of eating habits                                                    | 21.0 (1.7)                  | 21.9 (2.4)          | 15.3 (1.4)                  | 15.0 (1.2)          |
| Fever: $\geq 38.0$ °C ( $\geq 40.0$ °C)                                    | 9.3 (0.7)                   | 10.3 (0)            | 5.4 (0.6)                   | 4.9 (0.2)           |
| Vomiting                                                                   | 10.5 (0.7)                  | 6.8 (0.7)           | 4.6 (0.5)                   | 5.9 (0.4)           |
| Shivering                                                                  | 3.1 (0.2)                   | 3.1 (0)             | 3.3 (0.2)                   | 3.7 (0)             |

<sup>1</sup> All solicited local and systemic adverse events reported from Day 1 through Day 7 after vaccination are included

<sup>2</sup> Safety population: all subjects in the exposed population who provided post-vaccination safety data.

<sup>3</sup> Percentage of subjects with severe adverse reactions are presented in parenthesis.

Definition of severe local reactions: For induration, ecchymosis, and erythema, severe was defined as  $>50$  mm. For tenderness severe was defined as "Cried when limb was moved/spontaneously painful" in subjects  $<24$  months of age at time of first dose of vaccine and "Prevents daily activity" in subjects 24 months of age and older at time of first dose of vaccine.

Definition of severe systemic reactions: Severe change of eating habits was defined as "missed more than 2 feeds/meals"; severe sleepiness was defined as "sleeps most of the time and it is hard to arouse him/her"; severe vomiting or throwing up was defined as "6 or more times in 24 hours or requires intravenous hydration"; severe loose stools or diarrhea was defined as "6 or more loose stools in 24 hours or requires intravenous hydration"; severe irritability was defined as "unable to console"; severe shivering was defined as "prevents daily activity".

All unsolicited adverse events were collected for 28 days after last vaccination. Comparable percentages of unsolicited events were reported in children 6 months to less than 4 years of age in the FLUCELVAX® QUAD and US-licensed quadrivalent influenza comparator vaccine groups, (26.2% and 25.7%, respectively).

Serious adverse events (SAEs) were collected throughout the study duration (until 6 months after last vaccination). Comparable percentages of SAEs were reported in children 6 months to less than 4 years of age in the FLUCELVAX® QUAD and US-licensed quadrivalent influenza comparator vaccine groups, (0.9% and 0.9%, respectively). No SAE was assessed as being related to study vaccine.

### 8.3 Less Common Clinical Trial Adverse Reactions

See 8 ADVERSE REACTIONS, Clinical Trial Adverse Reactions.

#### 8.3.1 Less Common Clinical Trial Adverse Reactions – pediatrics

See 8 ADVERSE REACTIONS, Clinical Trial Adverse Reactions.

### 8.5 Post-Market Adverse Reactions

The following events have been identified during post-approval use of FLUCELVAX® or FLUCELVAX® QUAD:

**Immune system disorders:** Allergic or immediate hypersensitivity reactions, including anaphylactic shock.

**Nervous system disorders:** Syncope, presyncope, paraesthesia, Guillain-Barré syndrome.

**Skin and subcutaneous tissue disorders:** Generalized skin reactions including pruritus, urticaria, or non-specific rash.

**General disorders and administration site conditions:** Extensive swelling of injected limb.

## 9 DRUG INTERACTIONS

### 9.2 Drug Interactions Overview

Not applicable.

### 9.4 Drug-Drug Interactions

Interactions with other drugs have not been established.

There are no data available on co-administration of FLUCELVAX® with other vaccines.

If FLUCELVAX® is to be given at the same time as another injectable vaccine(s), the vaccine(s) should always be administered to separate limbs. It should be noted that adverse reactions may be intensified.

### 9.5 Drug-Food Interactions

Interactions with food have not been established.

### 9.6 Drug-Herb Interactions

Interactions with herbal products have not been established.

## 9.7 Drug-Laboratory Test Interactions

Interactions with laboratory tests have not been established.

## 10 CLINICAL PHARMACOLOGY

### 10.1 Mechanism of Action

FLUCELVAX® provides active immunization against three influenza virus strains (two A subtypes and one B type) contained in the vaccine. FLUCELVAX® induces humoral antibodies against the haemagglutinins. These antibodies neutralize influenza viruses.

Influenza illness and its complications follow infection with influenza viruses. Global surveillance and analysis of influenza virus isolates permits identification of yearly antigenic variants. Since 1977, antigenic variants of influenza A (H1N1 and H3N2) viruses and influenza B viruses have been in global circulation. Specific levels of hemagglutination inhibition (HI) antibody titers post-vaccination with inactivated influenza virus vaccine have not been correlated with protection from influenza virus. In some human studies, antibody titers of 1:40 or greater have been associated with protection from influenza illness in up to 50% of subjects.

Antibody against one influenza virus type or subtype confers limited or no protection against another. Furthermore, antibody to one antigenic variant of influenza virus might not protect against a new antigenic variant of the same type or subtype. Frequent development of antigenic variants through antigenic drift is the virologic basis for seasonal epidemics and the reason for the usual change of one or more strains in each year's influenza vaccine. Therefore, inactivated influenza vaccines are standardized to contain the hemagglutinin of influenza virus strains representing the influenza viruses likely to circulate in Canada in the upcoming winter on the basis of the recommendations from the World Health Organization (WHO) and the National Advisory Committee on Immunization (NACI).

### 10.2 Pharmacodynamics

Seroprotection is generally obtained within 3 weeks following vaccination.

Annual revaccination with the current vaccine is recommended because immunity declines during the year after vaccination and circulating strains of influenza virus change from year to year.

### 10.3 Pharmacokinetics

**Duration of Effect:** Protection against influenza post-vaccination is expected throughout the influenza season for which the vaccine is indicated.

## 11 STORAGE, STABILITY AND DISPOSAL

Store under refrigeration at 2° to 8°C. Do not freeze. Protect from exposure to light. Do not use after the expiration date. Any unused product or waste material should be disposed of in compliance with local requirements.

The multi-dose vial must be used within 28 days from removal of the first dose, and between uses, should be returned to the recommended storage conditions.

## PART II: SCIENTIFIC INFORMATION

### 13 PHARMACEUTICAL INFORMATION

#### Drug Substance

For the 2025-2026 season, FLUCELVAX® contains:

Influenza virus surface antigens (haemagglutinin and neuraminidase)\*, inactivated, of the following strains:

|                                                                                |                    |
|--------------------------------------------------------------------------------|--------------------|
| A/Wisconsin/67/2022 (H1N1)pdm09-like virus (A/Georgia/12/2022 CVR-167)         | 15 micrograms HA** |
| A/District of Columbia/27/2023 (H3N2)-like virus (A/Victoria/800/2024 CVR-289) | 15 micrograms HA** |
| B/Austria/1359417/2021-like virus (B/Singapore/WUH4618/2021)                   | 15 micrograms HA** |

per 0.5 mL dose

\* propagated in Madin Darby Canine Kidney (MDCK) cells

\*\* haemagglutinin

Proper name: Influenza Vaccine (surface antigen, inactivated, prepared in cell cultures)

Pharmaceutical standard: FLUCELVAX® is standardized according to recommendations from the World Health Organization (WHO) and National Advisory Committee on Immunization (NACI) for the Northern Hemisphere 2025 – 2026 season.

#### Product Characteristics:

FLUCELVAX® is a clear to slightly opalescent liquid.

FLUCELVAX® is a subunit influenza vaccine prepared from virus propagated in Madin Darby Canine Kidney (MDCK) cells, a continuous cell line. These cells were adapted to grow freely in suspension in culture medium. The virus is inactivated with beta-propiolactone, disrupted by the detergent cetyltrimethylammonium bromide and purified through several process steps. Each of the 3 virus strains is produced and purified separately then pooled to formulate the trivalent vaccine.

Eggs are not used in the manufacturing process, therefore, FLUCELVAX® does not contain egg protein.

### 14 CLINICAL TRIALS

Data for FLUCELVAX® QUAD are relevant to FLUCELVAX® because both vaccines are manufactured using the same process and have overlapping compositions.

#### 14.1 Trial Design and Study Demographics

One efficacy, safety and immunogenicity clinical trial (V58P13) was conducted in the United States, Finland and Poland with FLUCELVAX® in adults 18 to less than 50 years of age (V58P13). Four randomized clinical trials (V130\_01, V130\_03, V130\_12 and V130\_10) were conducted with FLUCELVAX® QUAD. Three safety and immunogenicity clinical trials (V130\_01, V130\_03 and V130\_10) were conducted in the United States: one in adults 18 years and older; one in children 4 to less than 18 years of age; and one in infants and young children 6 months to less than 4 years of age, respectively. One efficacy, safety and immunogenicity clinical trial (V130\_12) was conducted across geographical

regions in children 2 to less than 18 years of age. The trial designs and demographics of each randomized clinical trial are presented in Table 8.

**Table 8: Summary of Trial Designs and Study Demographics for Clinical Trials with FLUCELVAX® and FLUCELVAX® QUAD.**

| Study #                      | Trial design                                                                                                                                       | Dosage, route of administration and duration | Study subjects (N)*                            | Mean age (Range)*              | Sex**                                    |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------|--------------------------------|------------------------------------------|
| <b>1</b><br><b>(V58P13)</b>  | Randomized, observer-blind, placebo-controlled, multicenter study with FLUCELVAX® and egg-derived comparator influenza vaccine (TIVeA) and placebo | Single dose 0.5 mL IM                        | TIVc=3828<br>PLACEBO=3900<br>TIVe=3676         | 32.7 years<br>(18-49)          | Male: 1740 (45%)<br>Female: 2088 (55%)   |
| <b>2</b><br><b>(V130_01)</b> | Randomized, double-blind, controlled study with FLUCELVAX® QUAD and two formulations of comparator trivalent influenza vaccine (TIV1c or TIV2c)    | Single dose 0.5 mL IM                        | FLUCELVAX® QUAD=1335<br>TIV1c=676<br>TIV2c=669 | 57.4 years<br>(18-96)          | Male: 603 (45%)<br>Female: 732 (55%)     |
| <b>3</b><br><b>(V130_03)</b> | Randomized, double-blind, controlled study with FLUCELVAX® QUAD and two formulations of comparator trivalent influenza vaccine (TIV1c or TIV2c)    | Single dose***<br>0.5 mL IM                  | FLUCELVAX® QUAD=1159<br>TIV1c=593<br>TIV2c=581 | 9.5 years<br>(4-17)            | Male: 603 (52%)<br>Female: 556 (48%)     |
| <b>4</b><br><b>(V130_12)</b> | Randomized, observer-blind, controlled, multi-national study with FLUCELVAX® QUAD and non-influenza vaccine comparator                             | Single dose***<br>0.5 mL IM                  | FLUCELVAX® QUAD=2258<br>Comparator = 2256      | 8.7 years<br>(2-17)            | Male: 1152 (51%)<br>Female: 1106 (49%)   |
| <b>5</b><br><b>(V130_10)</b> | Randomized, observer-blind, comparator-controlled, multicenter study with FLUCELVAX® QUAD and a quadrivalent influenza vaccine comparator          | Single dose***<br>0.5 mL IM                  | FLUCELVAX® QUAD= 1605<br>QIV1= 809             | 28.1 months<br>(6 – 47 months) | Male: 803 (50.3%)<br>Female: 794 (49.7%) |

\*All randomized subjects.

\*\* Age and gender data are presented only for subjects who received FLUCELVAX® in Study 1 and FLUCELVAX® QUAD in studies 2, 3, 4 and 5.

\*\*\*Previously unvaccinated subjects <9 years of age received a second dose after 4 weeks.

TIVe = egg-based trivalent influenza vaccine (Agriflu)

## 14.2 Study Results

### Efficacy against Culture-Confirmed Influenza in Adults 18 years of age and above

A multi-national (U.S., Finland and Poland), randomized, observer-blinded, placebo-controlled trial (Study 1) was performed to assess the clinical efficacy and safety of FLUCELVAX® during the 2007-2008 influenza season in adults aged 18 to 49 years. A total of 11,404 subjects were enrolled to receive FLUCELVAX® (N=3828), Agriflu (N=3676) or placebo (N=3900) in a 1:1:1 ratio. Among the overall study population enrolled, the mean age was 33 years, 55% were female, 84% were Caucasian, 7% were Black, 7% were Hispanic, and 2% were of other ethnic origin.

Vaccine efficacy was assessed by the prevention of culture-confirmed symptomatic influenza illness caused by viruses antigenically matched to those in the vaccine compared to placebo. Influenza cases were identified by active and passive surveillance of influenza-like illness (ILI). ILI was defined according to Centers for Disease Control and Prevention (CDC) case definition, i.e., a fever (oral temperature  $\geq 100.0^{\circ}\text{F}$  /  $38^{\circ}\text{C}$ ) and cough or sore throat. After an episode of ILI, nose and throat swab samples were collected for analysis. Vaccine efficacies against vaccine-matched influenza viral strains, against all influenza viral strains, and against individual influenza viral subtypes were calculated (Tables 9 and 10).

**Table 9: Vaccine Efficacy against Culture-Confirmed Influenza**

|                                 | Number of subjects per protocol <sup>1</sup> | Number of subjects with influenza | Attack Rate (%) | Vaccine Efficacy <sup>2</sup> |                                   |
|---------------------------------|----------------------------------------------|-----------------------------------|-----------------|-------------------------------|-----------------------------------|
|                                 |                                              |                                   |                 | %                             | Lower Limit of One-Sided 97.5% CI |
| Antigenically Matched Strains   |                                              |                                   |                 |                               |                                   |
| FLUCELVAX®                      | 3776                                         | 7                                 | 0.19            | 83.8                          | 61.0 <sup>3</sup>                 |
| Placebo                         | 3843                                         | 44                                | 1.14            | --                            | --                                |
| All Culture-Confirmed Influenza |                                              |                                   |                 |                               |                                   |
| FLUCELVAX®                      | 3776                                         | 42                                | 1.11            | 69.5                          | 55.0                              |
| Placebo                         | 3843                                         | 140                               | 3.64            | --                            | --                                |

Abbreviations: CI = confidence interval.

<sup>1</sup> Per Protocol (PP) Population, Efficacy: All subjects in the Exposed/MITT Efficacy population who correctly received the vaccine, provided evaluable swab samples within the 120 hour time window, and had no major protocol violation as defined prior to unblinding. Exposed/Modified Intention-to-Treat (MITT) Efficacy Population: All subjects in the enrolled population who received a study vaccination. PP population: 52 (1.4%) and 57 (1.5%) of the enrolled subjects were excluded for FLUCELVAX® and placebo groups, respectively.

<sup>2</sup> Simultaneous one-sided 97.5% confidence intervals for the vaccine efficacy of each influenza vaccine relative to placebo based on the Sidak-corrected score confidence intervals for the two relative risks. Vaccine Efficacy =  $(1 - \text{Relative Risk}) \times 100\%$ .

<sup>3</sup> Vaccine Efficacy: Each vaccine was considered statistically compliant with the May 2007 CBER guidance for industry criteria for estimating VE against placebo if the lower limit of the one-sided simultaneous 97.5% Confidence Interval (CI) for the estimate of VE relative to placebo was greater than 40%.

**Table 10: Vaccine Efficacy of Trivalent Influenza Vaccine versus Placebo against Culture-Confirmed Influenza by Influenza Viral Subtype (Per Protocol Analysis Set<sup>1</sup>)**

|                                        | FLUCELVAX® (N=3776) |                                   | Placebo (N=3843) |                                   | Vaccine Efficacy <sup>2,4</sup> |                                   |
|----------------------------------------|---------------------|-----------------------------------|------------------|-----------------------------------|---------------------------------|-----------------------------------|
|                                        | Attack Rate (%)     | Number of Subjects with Influenza | Attack Rate (%)  | Number of Subjects with Influenza | %                               | Lower Limit of One-Sided 97.5% CI |
| <b>Antigenically Matched Strains</b>   |                     |                                   |                  |                                   |                                 |                                   |
| <b>A/H3N2<sup>3</sup></b>              | 0.05                | 2                                 | 0                | 0                                 | --                              | --                                |
| <b>A/H1N1</b>                          | 0.13                | 5                                 | 1.12             | 43                                | 88.2                            | 67.4                              |
| <b>B<sup>3</sup></b>                   | 0                   | 0                                 | 0.03             | 1                                 | --                              | --                                |
| <b>All Culture-Confirmed Influenza</b> |                     |                                   |                  |                                   |                                 |                                   |
| <b>A/H3N2</b>                          | 0.16                | 6                                 | 0.65             | 25                                | 75.6                            | 35.1                              |
| <b>A/H1N1</b>                          | 0.16                | 6                                 | 1.48             | 57                                | 89.3                            | 73.0                              |
| <b>B</b>                               | 0.79                | 30                                | 1.59             | 61                                | 49.9                            | 18.2                              |

Abbreviations: CI = confidence interval.

<sup>1</sup> Per Protocol (PP) Population, Efficacy: All subjects in the Exposed/MITT Efficacy population who correctly received the vaccine, provided evaluable swab samples within the 120 hour time window, and had no major protocol violation as defined prior to unblinding. Exposed/Modified Intention-to-Treat (MITT) Efficacy Population: All subjects in the enrolled population who received a study vaccination. PP population: 52 and 57 of the enrolled subjects were excluded for FLUCELVAX® and placebo groups, respectively.

<sup>2</sup> Simultaneous one-sided 97.5% confidence intervals for the vaccine efficacy of each influenza vaccine relative to placebo based on the Sidak-corrected score confidence intervals for the two relative risks. Vaccine Efficacy = (1 - Relative Risk) x 100%.

<sup>3</sup> There were too few cases of influenza due to vaccine-matched influenza A/H3N2 or B to adequately assess vaccine efficacy. Vaccine efficacy criterion were not pre-specified in the protocol for individual virus subtypes.

<sup>4</sup> Vaccine efficacy criterion were not pre-specified in the protocol for individual virus subtypes.

### **Efficacy of FLUCELVAX® QUAD in Children 2 to less than 18 years of age**

Absolute efficacy of FLUCELVAX® QUAD was evaluated in children 2 to less than 18 years of age in Study 4. This was a multi-national, randomized, non-influenza vaccine comparator-controlled efficacy, immunogenicity and safety study conducted in 8 countries during the following 3 influenza seasons: Southern Hemisphere 2017, Northern Hemisphere 2017/2018 and Northern Hemisphere 2018/2019. The study enrolled 4,514 subjects. Out of the 4514 enrolled, 4513 received either FLUCELVAX® QUAD (N=2,258) or a non-influenza vaccine comparator vaccine (N=2255). The full analysis set (FAS) for efficacy consisted of 4509 subjects.

Children 2 to less than 9 years of age received either one or two doses (separated by 4 weeks) of FLUCELVAX® QUAD or comparator vaccine depending on the subject's prior influenza vaccination history. Children 9 to less than 18 years of age received a single dose of FLUCELVAX® QUAD or comparator vaccine. Among all enrolled subjects (N=4514), the mean age was 8.8 years, 48% were female, 51% were 2 to less than 9 years of age, 50% were Caucasian and 49% were Asian. There were no notable differences in the distribution of demographic and baseline characteristics between the two treatment groups.

The primary efficacy objective of the study was to demonstrate the absolute vaccine efficacy (VE) of FLUCELVAX® QUAD versus a non-influenza comparator determined by the first occurrence of RT-PCR or culture-confirmed influenza, due to any influenza Type A and B strain in subjects 2 to less than 18 years

of age. The success criterion for this primary objective was as follows: The efficacy of FLUCELVAX® QUAD was demonstrated if the lower limit of the 2-sided 95% confidence interval (CI) for VE was above 20%.

FLUCELVAX® QUAD efficacy was assessed by the prevention of confirmed influenza illness caused by any influenza Type A or B strain. Influenza cases were identified by active and passive surveillance of influenza-like illness (ILI) and confirmed by cell culture and/or real-time polymerase chain reaction (RT-PCR). ILI was defined as a fever (oral temperature  $\geq 100.0^{\circ}\text{F}$  /  $37.8^{\circ}\text{C}$ ) along with any of the following: cough, sore throat, nasal congestion, or rhinorrhea. Overall vaccine efficacy against all influenza viral subtypes and against individual influenza viral subtypes antigenically similar to the subtypes in the vaccine were calculated. (Table 11)

**Table 11: Vaccine Efficacy of FLUCELVAX® QUAD Against First Occurrence RT-PCR Confirmed or Culture Confirmed Influenza in Subjects 2 to less than 18 years of age– FAS Efficacy<sup>1</sup> (Study 4).**

|                                                   | Number of subjects per protocol <sup>1</sup> | Number of cases of influenza | Attack Rate (%) | Vaccine Efficacy (VE) <sup>2</sup> |                                      |
|---------------------------------------------------|----------------------------------------------|------------------------------|-----------------|------------------------------------|--------------------------------------|
|                                                   |                                              |                              |                 | VE %                               | 95% Confidence Interval <sup>3</sup> |
| RT-PCR or Culture Confirmed Influenza             |                                              |                              |                 |                                    |                                      |
| FLUCELVAX® QUAD                                   | 2257                                         | 175                          | 7.8             | 54.6                               | 45.7, 62.1                           |
| Non-Influenza Comparator                          | 2252                                         | 364                          | 16.2            | -                                  | -                                    |
| Culture Confirmed Influenza                       |                                              |                              |                 |                                    |                                      |
| FLUCELVAX® QUAD                                   | 2257                                         | 115                          | 5.1             | 60.8                               | 51.3, 68.5                           |
| Non-Influenza Comparator                          | 2252                                         | 279                          | 12.4            | -                                  | -                                    |
| Antigenically Matched Culture-Confirmed Influenza |                                              |                              |                 |                                    |                                      |
| FLUCELVAX® QUAD                                   | 2257                                         | 90                           | 4.0             | 63.6                               | 53.6, 71.5                           |
| Non-Influenza Comparator                          | 2252                                         | 236                          | 10.5            | -                                  | -                                    |

<sup>1</sup> Number of subjects in the Full-Analysis Set (FAS) – Efficacy, which included all subjects randomized, received a study vaccination and provided efficacy data.

<sup>2</sup> Efficacy against influenza was evaluated over three influenza seasons, SH 2017, NH 2017-18 and NH 2018-19

<sup>3</sup> FLUCELVAX® QUAD met the pre-defined success criterion defined as the lower limit of the two-sided 95% CI of absolute vaccine efficacy greater than 20%

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Vaccine efficacy by viral subtype is described in Table 12.

**Table 12: Vaccine Efficacy of FLUCELVAX QUAD against RT-PCR Confirmed or Culture-Confirmed Influenza by Influenza Viral Subtype in Subjects 2 to less than 18 years of age - FAS Efficacy<sup>1</sup> (Study 4)**

|                                              | FLUCELVAX® QUAD<br>(N=2257) |                                   | Non-influenza Comparator<br>(N=2252) |                                   | Vaccine Efficacy <sup>2, 3</sup> |                                      |
|----------------------------------------------|-----------------------------|-----------------------------------|--------------------------------------|-----------------------------------|----------------------------------|--------------------------------------|
|                                              | Attack Rate (%)             | Number of Subjects with Influenza | Attack Rate (%)                      | Number of Subjects with Influenza | VE %                             | 95% Confidence Interval <sup>4</sup> |
| <b>RT-PCR or Culture Confirmed Influenza</b> |                             |                                   |                                      |                                   |                                  |                                      |
| <b>A/H1N1</b>                                | 0.9                         | 21                                | 4.7                                  | 105                               | 80.7                             | 69.2, 87.9                           |
| <b>A/H3N2</b>                                | 2.7                         | 60                                | 4.5                                  | 102                               | 42.1                             | 20.3, 57.9                           |
| <b>Type B</b>                                | 3.6                         | 81                                | 6.7                                  | 150                               | 47.6                             | 31.4, 60.0                           |

Abbreviations: CI = confidence interval.

<sup>1</sup> Number of subjects in the Full-Analysis Set (FAS) – Efficacy, which included all subjects randomized, received a study vaccination and provided efficacy data.

<sup>2</sup> Efficacy against influenza was evaluated over three influenza seasons, SH 2017, NH 2017-18 and NH 2018-19

<sup>3</sup> The efficacy of FLUCELVAX® QUAD was calculated using a time-to-event methodology based on a Cox proportional hazard model adjusted for age, country, influenza vaccination history, and season. Confidence intervals for all endpoints have not been adjusted for multiplicity.

<sup>4</sup> Vaccine efficacy criterion were not pre-specified in the protocol for individual virus subtypes.

Study 4: NCT03165617

#### 14.4 Immunogenicity

##### Immunogenicity of FLUCELVAX® QUAD in Adults 18 years of age and above

Immunogenicity was evaluated in adults 18 years of age and older in a randomized, double-blind, controlled study conducted in the U.S. (Study 2). In this study, subjects received FLUCELVAX® QUAD or one of the two formulations of comparator trivalent influenza vaccine (FLUCELVAX® QUAD N=1334, TIV1c N=677 or TIV2c N=669), each containing an influenza type B virus that corresponded to one of the two B viruses in QIV (a type B virus of the Massachusetts lineage (TIV1c) or a type B virus of the Brisbane lineage (TIV2c)), respectively and the same influenza A subtype viruses. The treatment randomization ratio was 2:1:1 (FLUCELVAX® QUAD:TIV1c:TIV2c). In the per protocol set, the mean age of subjects who received FLUCELVAX® QUAD was 57.5 years; 55.1% of subjects were female and 76.1% of subjects were Caucasian, 13% were black and 9% were Hispanics. The immune response to each of the vaccine antigens was assessed 21 days after vaccination.

The immunogenicity endpoints were geometric mean antibody titers (GMTs) of HI antibodies response and percentage of subjects who achieved seroconversions, defined as a pre-vaccination HI titer of <1:10 with a post-vaccination titer ≥1:40 or with a pre-vaccination HI titer of ≥10 and a minimum 4-fold increase in serum HI antibody titer. Noninferiority criteria for GMT was defined as the upper bound of the 2-sided 95% confidence interval (CI) for the ratio of GMTs (GMT TIV1c or TIV2c / GMT FLUCELVAX® QUAD) for HI antibody should not exceed the noninferiority margin of 1.5. Noninferiority criteria for seroconversion was defined as the upper bound of the 2-sided 95% CI for the difference between seroconversion rates (% seroconversion TIV1c or TIV2c – % seroconversion FLUCELVAX® QUAD) for HI antibody should not exceed the margin of 10%.

FLUCELVAX® QUAD was noninferior to trivalent influenza vaccine. Noninferiority was established for all 4 influenza strains included in FLUCELVAX® QUAD, as assessed by ratios of GMTs and the differences in the percentages of subjects achieving seroconversion at 3 weeks following vaccination (Table 13).

**Table 13: Noninferiority of FLUCELVAX® QUAD Relative to Trivalent Influenza Vaccine in Adults 18 Years of Age and Above, Per Protocol Analysis Set<sup>c</sup>**

|        |                                              | <b>FLUCELVAX® QUAD<br/>N = 1250</b> | <b>TIV1c/TIV2c<sup>a</sup><br/>N = 635/N = 639</b> | <b>Vaccine<br/>group Ratio<br/>(95% CI)</b> | <b>Vaccine Group<br/>Difference<br/>(95% CI)</b> |
|--------|----------------------------------------------|-------------------------------------|----------------------------------------------------|---------------------------------------------|--------------------------------------------------|
| A/H1N1 | GMT<br>(95% CI)                              | 302.8<br>(281.8-325.5)              | 298.9<br>(270.3-330.5)                             | 1.0<br>(0.9- <b>1.1</b> )                   | -                                                |
|        | Seroconversion<br>Rate <sup>b</sup> (95% CI) | 49.2%<br>(46.4-52.0)                | 48.7%<br>(44.7-52.6)                               | -                                           | -0.5%<br>(-5.3- <b>4.2</b> )                     |
| A/H3N2 | GMT<br>(95% CI)                              | 372.3<br>(349.2-396.9)              | 378.4<br>(345.1-414.8)                             | 1.0<br>(0.9- <b>1.1</b> )                   | -                                                |
|        | Seroconversion<br>Rate <sup>b</sup> (95% CI) | 38.3%<br>(35.6-41.1)                | 35.6%<br>(31.9-39.5)                               | -                                           | -2.7%<br>(-7.2- <b>1.9</b> )                     |
| B1     | GMT<br>(95% CI)                              | 133.2<br>(125.3-141.7)              | 115.6<br>(106.4-125.6)                             | 0.9<br>(0.8- <b>1.0</b> )                   | -                                                |
|        | Seroconversion<br>Rate <sup>b</sup> (95% CI) | 36.6%<br>(33.9-39.3)                | 34.8%<br>(31.1-38.7)                               | -                                           | -1.8%<br>(-6.2- <b>2.8</b> )                     |
| B2     | GMT<br>(95% CI)                              | 177.2<br>(167.6-187.5)              | 164.0<br>(151.4-177.7)                             | 0.9<br>(0.9- <b>1.0</b> )                   | -                                                |
|        | Seroconversion<br>Rate <sup>b</sup> (95% CI) | 39.8%<br>(37.0-42.5)                | 35.4%<br>(31.7-39.2)                               | -                                           | -4.4%<br>(-8.9- <b>0.2</b> )                     |

Abbreviations: CI = confidence interval, GMT = geometric mean titer.

**Success criteria:** The upper bound of the two-sided 95% confidence interval (CI) on the ratio of the GMTs (calculated as comparator GMT TIV1c/TIV2c divided by GMT FLUCELVAX® QUAD) does not exceed 1.5. The upper bound of the two-sided 95% CI on the difference between the SCR (calculated as Seroconversion comparator TIV1c/TIV2c minus Seroconversion FLUCELVAX® QUAD) does not exceed 10%.

<sup>a</sup> The comparator vaccine for noninferiority comparisons for A/H1N1, A/H3N2 and B1 is TIV1c, for B2 it is TIV2c.

<sup>b</sup> Seroconversion rate = percentage of subjects with either a prevaccination HI titer < 1:10 and postvaccination HI titer ≥ 1:40 or with a prevaccination HI titer ≥ 1:10 and a minimum 4-fold increase in postvaccination HI antibody titer.

<sup>c</sup> The per protocol (PP) analysis set is defined as all subjects in the FAS Immunogenicity who correctly received the vaccine (i.e., receive the vaccine to which the subjects is randomized and at the scheduled time points), had no major protocol deviations leading to exclusion as defined prior to unblinding/analysis and are not excluded due to other reasons defined prior to unblinding or analysis. PP population: 85 (6.4%), 41 (6.1%) and 31 (4.5%) enrolled subjects were excluded for FLUCELVAX® QUAD, TIV1c and TIV2c groups, respectively.

### Immunogenicity in Children and Adolescents 6 months to less than 18 years of age

Immunogenicity of FLUCELVAX® QUAD was evaluated in children 4 to less than 18 years of age as part of a randomized, double-blind, controlled study conducted in U.S. (Study 3). In this study, subjects received FLUCELVAX® QUAD or one of the two formulations of comparator trivalent influenza vaccine (FLUCELVAX® QUAD N=1159, TIV1c N=593 or TIV2c N=580). Subjects were randomized at an approximately 2:1:1 ratio to receive FLUCELVAX® QUAD, TIV1c, or TIV2c vaccine. Enrolled subjects were first split into age cohorts based on age at time of enrollment (at least 4 to less than 9 years of age and at least 9 to less than 18 years of age). In the per protocol set, the mean age was 9.8 years; 47% of

subjects were female and 54% of subjects were Caucasian, 22% were black and 19% were Hispanics. The immune response to each of the vaccine antigens was assessed, 21 days after vaccination.

The immunogenicity endpoints were GMTs of HI antibodies response and percentage of subjects who achieved seroconversions, defined as a pre-vaccination HI titer of <1:10 with a post-vaccination titer  $\geq$ 1:40 or with a pre-vaccination HI titer  $\geq$  1:10 and a minimum 4-fold increase in serum HI antibody titer. The definition of noninferiority criteria for GMT and seroconversion was the same as for Study 1.

FLUCELVAX® QUAD was noninferior to trivalent influenza vaccine. Noninferiority was established for all 4 influenza strains included in the FLUCELVAX® QUAD, as assessed by ratios of GMTs and the differences in the percentages of subjects achieving seroconversion at 3 weeks following vaccination (Table 14).

**Table 14: Noninferiority<sup>a</sup> of FLUCELVAX® QUAD Relative to Trivalent Influenza Vaccine in Children and Adolescents 4 to less than 18 Years of Age, Per Protocol Analysis Set**

|        |                                              | FLUCELVAX®<br>QUAD  | TIV1c/TIV2c <sup>b</sup> | Vaccine Group<br>Ratio       | Vaccine Group<br>Difference |
|--------|----------------------------------------------|---------------------|--------------------------|------------------------------|-----------------------------|
| A/H1N1 |                                              | N=1014              | N=510                    |                              |                             |
|        | GMT (95% CI)                                 | 1090<br>(1027-1157) | 1125<br>(1034-1224)      | 1.03<br>(0.93- <b>1.14</b> ) | -                           |
|        | Seroconversion Rate <sup>c</sup><br>(95% CI) | 72%<br>(69-75)      | 75%<br>(70-78)           | -                            | 2%<br>(-2.5- <b>6.9</b> )   |
| A/H3N2 |                                              | N=1013              | N=510                    |                              |                             |
|        | GMT (95% CI)                                 | 738<br>(703-774)    | 776<br>(725-831)         | 1.05<br>(0.97- <b>1.14</b> ) | -                           |
|        | Seroconversion Rate <sup>c</sup><br>(95% CI) | 47%<br>(44-50)      | 51%<br>(46-55)           | -                            | 4%<br>(-1.4- <b>9.2</b> )   |
| B1     |                                              | N=1013              | N=510                    |                              |                             |
|        | GMT (95% CI)                                 | 155<br>(146-165)    | 154<br>(141-168)         | 0.99<br>(0.89- <b>1.1</b> )  | -                           |
|        | Seroconversion Rate <sup>c</sup><br>(95% CI) | 66%<br>(63-69)      | 66%<br>(62-70)           | -                            | 0%<br>(-5.5- <b>4.5</b> )   |
| B2     |                                              | N=1009              | N= 501                   |                              |                             |
|        | GMT (95% CI)                                 | 185<br>(171-200)    | 185<br>(166-207)         | 1<br>(0.87- <b>1.14</b> )    | -                           |
|        | Seroconversion Rate <sup>c</sup><br>(95% CI) | 73%<br>(70-76)      | 71%<br>(67-75)           | -                            | -2%<br>(-6.5- <b>3.2</b> )  |

Abbreviations: CI = confidence interval, GMT = geometric mean titer.

**Success criteria:** The upper bound of the two-sided 95% confidence interval (CI) on the ratio of the GMTs (calculated as comparator GMT TIV1c/TIV2c divided by GMT FLUCELVAX® QUAD) does not exceed 1.5. The upper bound of the two-sided 95% CI on the difference between the SCR (calculated as Seroconversion comparator TIV1c/TIV2c minus Seroconversion FLUCELVAX® QUAD) does not exceed 10%.

<sup>a</sup> Analyses are performed on data for day 22 for previously vaccinated subjects and day 50 for not previously vaccinated subjects.

<sup>b</sup> The comparator vaccine for noninferiority comparisons for A/H1N1, A/H3N2 and B1 is TIV1c, for the B2 strain the comparator vaccine is TIV2c.

<sup>c</sup> Seroconversion rate = percentage of subjects with either a pre-vaccination HI titer < 1:10 and post-vaccination HI titer  $\geq$  1:40 or with a pre-vaccination HI titer  $\geq$  1:10 and a minimum 4-fold increase in postvaccination HI antibody titer.

The definition of the PP analysis set in study V130\_03 is the same as in V130\_01, see Table 12 above. PP population: 145 (12.5%), 83 (14.0%) and 79 (13.6%) enrolled subjects were excluded for FLUCELVAX® QUAD, TIV1c and TIV2c groups, respectively.

Immunogenicity of FLUCELVAX® QUAD was evaluated in children 6 months to less than 4 years of age in a randomized, observer-blind, multicenter study conducted in the US (Study 5). In this study, subjects received FLUCELVAX® QUAD or a US-licensed comparator quadrivalent influenza vaccine (FLUCELVAX QIV N=1597, Comparator QIV N=805). In the per protocol set, the mean age of subjects who received FLUCELVAX® QUAD was 29 months; 49% of subjects were female and 67% of subjects were Caucasian, 27% were Black and <1% were Asian, Hawaiian or other Pacific Islander and American Indian or Alaska Native. Twenty six percent of subjects were of Hispanic origin. The immune response to each of the vaccine antigens was assessed 28 days after last vaccination.

The immunogenicity endpoints were geometric mean antibody titers (GMTs) and percentage of subjects who achieved seroconversion, defined as a pre-vaccination HI or MN titer of <1:10 with a post-vaccination titer  $\geq$ 1:40 or with a pre-vaccination HI or MN titer  $\geq$  1:10 and a minimum 4-fold increase in serum antibody titer. GMTs and seroconversion rates were measured by hemagglutination inhibition (HI) assay for A/H1N1, B/Yamagata and B/Victoria strains and by microneutralization (MN) assay for the A/H3N2 strain.

FLUCELVAX® QUAD was noninferior to the Comparator QIV. Noninferiority was established for all 4 influenza strains as assessed by ratios of GMTs and the differences in the percentages of subjects achieving seroconversion at 4 weeks following vaccination.

The noninferiority data observed are summarized in Table 15.

**Table 15: Noninferiority<sup>a</sup> of FLUCELVAX® QUAD Relative to Comparator QIV in Children 6 Months to Less Than 4 Years of Age – Per-Protocol Analysis Set**

|            |                                              | FLUCELVAX®<br>QUAD    | Comparator QIV        | Vaccine Group<br>Ratio       | Vaccine Group<br>Difference     |
|------------|----------------------------------------------|-----------------------|-----------------------|------------------------------|---------------------------------|
| A/H1N1     |                                              | N = 1092              | N =575                |                              |                                 |
|            | GMT (95% CI)                                 | 78.0<br>(70.8, 86.0)  | 57.3<br>(50.8, 64.6)  | 0.73<br>(0.65, <b>0.84</b> ) | -                               |
|            | Seroconversion<br>Rate <sup>b</sup> (95% CI) | 58.2%<br>(55.3, 61.2) | 46.8%<br>(42.6, 51.0) | -                            | -11.5<br>(-16.5, <b>-6.4</b> )  |
| A/H3N2     |                                              | N = 1078              | N = 572               |                              |                                 |
|            | GMT (95% CI)                                 | 23.1<br>(21.2, 25.1)  | 23.9<br>(21.6, 26.6)  | 1.04<br>(0.93, <b>1.16</b> ) | -                               |
|            | Seroconversion<br>Rate <sup>b</sup> (95% CI) | 27.6%<br>(25.0, 30.4) | 30.8%<br>(27.0, 34.7) | -                            | 3.1<br>(-1.4, <b>7.8</b> )      |
| B/Yamagata |                                              | N = 1092              | N = 575               |                              |                                 |
|            | GMT (95% CI)                                 | 35.6<br>(32.9, 38.6)  | 26.0<br>(23.5, 28.6)  | 0.73<br>(0.66, <b>0.81</b> ) | -                               |
|            | Seroconversion<br>Rate <sup>b</sup> (95% CI) | 46.5%<br>(43.5, 49.5) | 31.7%<br>(27.9, 35.6) | -                            | -14.9<br>(-19.6, <b>-10.0</b> ) |
| B/Victor   |                                              | N = 1092              | N = 575               |                              |                                 |
|            | GMT (95% CI)                                 | 22.4<br>(20.7, 24.2)  | 19.6<br>(17.8, 21.6)  | 0.88<br>(0.79, <b>0.97</b> ) | -                               |

|  |                                           |                       |                       |   |                       |
|--|-------------------------------------------|-----------------------|-----------------------|---|-----------------------|
|  | Seroconversion Rate <sup>b</sup> (95% CI) | 30.3%<br>(27.6, 33.1) | 24.4%<br>(20.9, 28.1) | - | -6.0<br>(-10.3, -1.4) |
|--|-------------------------------------------|-----------------------|-----------------------|---|-----------------------|

**Abbreviations:** CI = confidence interval, GMT = geometric mean titer.

**Assays:** GMTs and seroconversion rates were measured by hemagglutination inhibition (HI) assay for A/H1N1, B/Yamagata and B/Victoria strains and by microneutralization (MN) assay for the A/H3N2 strain, using cell-derived target viruses.

**Success criteria:** The upper bound of the two-sided 95% confidence interval (CI) on the ratio of the GMTs (calculated as GMT US-licensed comparator QIV divided by GMT FLUCELVAX® QUAD) does not exceed 1.5. The upper bound of the two-sided 95% CI on the difference between the SCR (calculated as Seroconversion US-licensed comparator QIV minus Seroconversion FLUCELVAX® QUAD) does not exceed 10%.

<sup>a</sup> Analyses are performed on data for Day 29 for previously vaccinated subjects and Day 57 for not previously vaccinated subjects

<sup>b</sup> Seroconversion rate = percentage of subjects with either a pre-vaccination titer < 1:10 and post-vaccination titer ≥ 1:40 or with a pre-vaccination titer ≥ 1:10 and a minimum 4-fold increase in post-vaccination antibody titer

Geometric means and 95% CIs were calculated by taking the anti-logs of the means and 95% CI of the log transformed immunogenicity parameters. Exact CIs based upon the binomial distribution were calculated for percentages. The difference between the proportions of treatment groups was determined and the corresponding 2-sided 95% CIs were calculated by Miettinen-Nurminen method. Per Protocol Set (PPS) comprised all subjects in the FAS Immunogenicity for whom there was no protocol deviation that was medically assessed as having potential to impact the immunogenicity results.

## 15 MICROBIOLOGY

No microbiological information is required for this drug product.

## 16 NON-CLINICAL TOXICOLOGY

Non-clinical data reveal no special hazard for humans based on a repeat dose toxicity study and a reproductive and developmental toxicity study with FLUCELVAX.

**General Toxicology:** In a repeat-dose toxicity study, male and female rabbits received 2 intramuscular doses of trivalent vaccine (45 mcg HA/dose) 1 week apart. There was no evidence of systemic toxicity and trivalent vaccine was locally well tolerated.

**Reproductive and Developmental Toxicology:** In a reproductive and developmental toxicity study, the effect of cell culture-derived antigens on embryo-foetal and postnatal development was evaluated in pregnant rabbits. Female rabbits were administered vaccine (45 mcg HA/dose) by intramuscular injection 3 times prior to gestation, during the period of organogenesis (gestation day 7) and later in pregnancy (gestation day 20), 0.5 mL/rabbit/occasion (approximately 11-fold excess relative to the projected adult human dose (60 mcg) on a body weight basis). No adverse effects on mating, female fertility, pregnancy, embryo-foetal development, or post-natal development were observed. There were no vaccine-related foetal malformations or other evidence of teratogenesis.

Genotoxicity and carcinogenic potential were not assessed.

## PATIENT MEDICATION INFORMATION

### READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE

#### FLUCELVAX®

#### Influenza Vaccine, suspension for injection

Read this carefully before you are given **FLUCELVAX®**. This leaflet is a summary and will not tell you everything about this vaccine. Talk to your healthcare professional about your medical condition and treatment and ask if there is any new information about **FLUCELVAX®**.

#### What is **FLUCELVAX®** used for?

**FLUCELVAX®** is used in adults and children 6 months and older to prevent influenza, often called “the flu.”

Influenza is caused by infection with specific influenza viruses. New types of influenza viruses can appear each year. **FLUCELVAX®** vaccine contains fragments of three different types of influenza virus. Each year the World Health Organization decides which three types of viruses are most suitable to include in the vaccine.

For this season (2025 – 2026) the viruses are A/Wisconsin/67/2022 (H1N1)pdm09-like virus, A/District of Columbia/27/2023 (H3N2)-like virus, and B/Austria/1359417/2021-like virus.

You cannot catch influenza from the vaccine, as the virus in the vaccine has been killed and split into small non-infectious particles.

The National Advisory Committee on Immunization (NACI) encourages annual influenza vaccination for all Canadians who are able to have the vaccine.

Vaccination against influenza is recommended every year, for anyone wanting to lower their chance of catching influenza. **FLUCELVAX®** has been used by many people to lower their risk of catching the flu.

#### How does **FLUCELVAX®** work?

**FLUCELVAX®** vaccine works by helping your body to protect itself against infection by the types of influenza viruses that are in the vaccine. The vaccine stimulates the body to make substances called antibodies. Antibodies fight the influenza virus. If you have been vaccinated, when you come into contact with the influenza viruses in the vaccine, your body is usually able quickly to destroy the virus, which may prevent you from getting influenza.

Your body takes a few weeks after vaccination to fully develop effective protection against the influenza virus.

Protection against influenza generally requires one dose of **FLUCELVAX®** vaccine, however, some children less than 9 years of age may require two doses (see section **Usual dose**).

As with all vaccines, 100% protection cannot be guaranteed.

#### What are the ingredients in **FLUCELVAX®**?

Medicinal ingredients:

Each 0.5 mL dose of the vaccine contains 15 mcg haemagglutinin (HA) from each influenza strain:

- A/Wisconsin/67/2022 (H1N1)pdm09-like virus (A/Georgia/12/2022 CVR-167)
- A/District of Columbia/27/2023 (H3N2)-like virus (A/Victoria/800/2024 CVR-289)

- B/Austria/1359417/2021-like virus (B/Singapore/WUH4618/2021)

**Non-medicinal ingredients:**

- Beta-propiolactone\*\*,
- Cetyltrimethylammonium bromide\*\*,
- Disodium phosphate dihydrate,
- Magnesium chloride hexahydrate,
- Polysorbate 80\*\*,
- Potassium chloride,
- Potassium dihydrogen phosphate,
- Sodium chloride,
- Thimerosal\*,
- Water for injections

\*Thimerosal is included in multi-dose vials only.

\*\*Residuals

FLUCELVAX® is not made using eggs, therefore, there are no egg proteins in the vaccine.

The syringe and vial components do not contain latex. FLUCELVAX® is considered safe for use in persons with latex allergies.

FLUCELVAX® pre-filled syringes contain no preservative or antibiotics. FLUCELVAX® multi-dose vial formulation contains a preservative, but does not contain any antibiotics.

**FLUCELVAX® comes in the following dosage forms:**

FLUCELVAX® is supplied as a suspension for intramuscular injection in either a 0.5 mL single-dose, pre-filled syringe or a 5 mL multi-dose vial.

**Do not use FLUCELVAX® if:**

- Your child is under 6 months of age. FLUCELVAX® vaccine is only approved for use in children aged 6 months and older.
- You or your child have or previously have had an allergy to FLUCELVAX® or any ingredient listed in this leaflet.

**To help avoid side effects and ensure proper use, talk to your healthcare professional before you take FLUCELVAX®. Talk about any health conditions or problems you may have, including if you or your child:**

- **have or have had a reaction to vaccination with any of the following:**
  - severe allergic reaction
  - difficulty breathing
  - swelling of the throat
  - fainting or collapse
  - fits or convulsions
  - high temperature (greater than 38.5°C)
  - severe skin reaction at the injection site, including severe bruising

- **have an infection or temperature higher than 38.5°C.** Your doctor may decide to delay vaccination until the illness has passed. A minor illness such as a cold is not usually a reason to delay vaccination.
- **have low immunity due to treatment with certain medicines**
- **have or have had Guillain-Barré Syndrome (GBS),** an illness which affects the nervous system and causes paralysis.
- **have allergies to other medicines or substances**
- **are pregnant or breastfeeding.** Your healthcare professional will be able to discuss the potential risks and benefits of having FLUCELVAX® while you are pregnant or breastfeeding.
- **have experienced fainting, or feeling faint, with a previous injection.** Fainting can occur following, or even before, any vaccination. Appropriate measures should be taken to prevent injury from falling.

**Tell your healthcare professional about all the medicines you take, including any drugs, vitamins, minerals, natural supplements or alternative medicines.**

**The following may interact with FLUCELVAX®:**

No data are available on administration of FLUCELVAX® with other vaccines.

**How FLUCELVAX® is given:**

FLUCELVAX® is given as an injection into a muscle, usually in the upper arm.

**Usual dose:**

FLUCELVAX® is given once every year as follows:

- Adults and children 9 years and over: one injection of 0.5 mL.

For children 6 months to less than 9 years old who are receiving influenza vaccine for the first time, it is recommended that a follow-up (booster) dose of FLUCELVAX® is given 4 weeks after the first dose.

If the follow-up dose is missed, talk to your healthcare professional and arrange another visit as soon as possible.

**Overdose:**

If you think you have been given too many doses of FLUCELVAX® or have been given it by mistake, contact your healthcare professional, hospital emergency department or regional poison control centre immediately, even if there are no symptoms.

**What are possible side effects from using FLUCELVAX®?**

These are not all the possible side effects you or your child may experience after receiving FLUCELVAX®. If you or your child experience any side effects not listed here, tell your healthcare professional.

The following are common or very common side effects of FLUCELVAX®. Most of these side effects are mild and do not last long. Tell your doctor if you or your child have side effects that bother you:

- Injection site pain, reddening, hardening or swelling
- Headache

- Muscle or joint pain
- Tiredness
- Nausea, vomiting, diarrhea
- Loss of appetite
- Bruising
- Shivering

Younger children may also experience the following common or very common side effects:

- Injection site tenderness
- Irritability
- Sleepiness
- Change of eating habits.
- Fever

| Serious side effects and what to do about them                                                                                 |                                      |              |                                                 |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------|-------------------------------------------------|
| Symptom / effect                                                                                                               | Talk to your healthcare professional |              | Stop taking drug and get immediate medical help |
|                                                                                                                                | Only if severe                       | In all cases |                                                 |
| <b>RARE</b>                                                                                                                    |                                      |              |                                                 |
| <b>Anaphylaxis</b><br>Difficulty breathing, dizziness, a weak and rapid pulse, skin rash                                       |                                      | ✓            |                                                 |
| <b>Allergic reaction</b><br>Rash, itching or hives on the skin, swelling of the face, lips, tongue, or other parts of the body |                                      | ✓            |                                                 |

If you or your child have a troublesome symptom or side effect that is not listed here or becomes bad enough to interfere with your daily activities, tell your healthcare professional.

#### Reporting Suspected Side Effects for Vaccines

**For the general public:** Should you or your child experience a side effect following immunization, please report it to your healthcare professional.

Should you require information related to the management of the side effect, please contact your healthcare professional. The Public Health Agency of Canada, Health Canada and Seqirus cannot provide medical advice.

**For healthcare professionals:** If a patient experiences a side effect following immunization, please complete the Adverse Events Following Immunization (AEFI) Form appropriate for your province/territory (<http://www.phac-aspc.gc.ca/im/aefi-essi-form-eng.php>) and send it to your local Health Unit.

**Storage:**

Store in a refrigerator between 2° to 8°C. Do not freeze. Protect from light. Do not use after the expiration date. The multi-dose vial must be used within 28 days from the initial removal of the first dose and between uses, return the multi-dose vial to the recommended storage conditions.

Keep out of reach and sight of children.

**If you want more information about FLUCELVAX®:**

- Talk to your healthcare professional
- Find the full product monograph that is prepared for healthcare professionals and includes this Patient Medication Information by visiting the Health Canada website: <https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/drug-product-database.html>; the manufacturer's website [www.seqirus.ca](http://www.seqirus.ca), or by calling 1-855-358-8966.

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