OPHTHALMIC DROP DOSAGE FORM:SINGL DOSE, MULTIPLE DOSE

Eyes are undoubtedly one of the most sensitive and vital organs in the human body, that is why Ophthalmic drug forms have been one of the most important and widely developed and restricted field of pharmaceutical technology for many years.

Ophthalmic drug market:

The global ophthalmology drugs market is expected to decline from $24,640.0 million in 2019 to $19,831.3 million in 2020 at a compound annual growth rate (CAGR) of -19.5%. The decline is mainly due to economic slowdown across countries owing to the COVID-19 outbreak and the measures to contain it. The market is then expected to recover and grow to reach $53,698.87 million by 2030 [1,2020], as shown in the **Figure 1**.

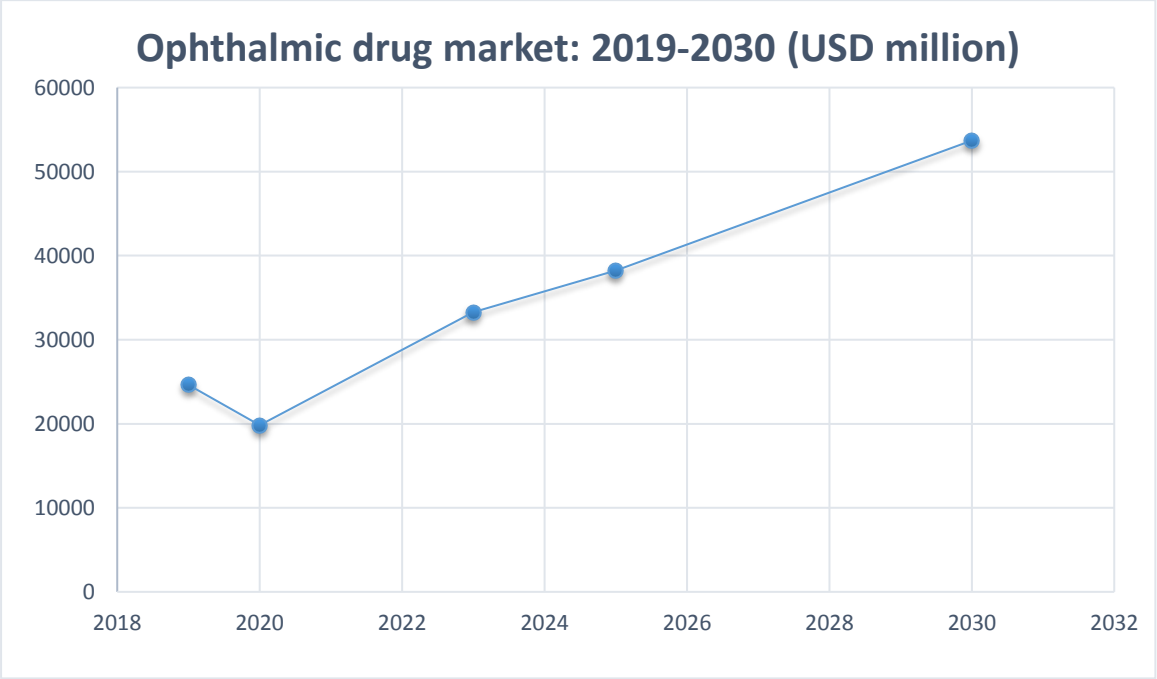

Figure 1 - Ophthalmic drug market

[1] Global Ophthalmology Drugs Market Opportunities and Strategies (2019 to 2030) - COVID-19 Impact and Recovery: Research and Markets, 2020

Global Ophthalmic Market Variables:

The ophthalmic drugs market is affected by many factors, some of which affect positively and lead to market growth, and some have a negative impact and hinder market growth[1, 2020], these factors are shown in the **Figure 2**:

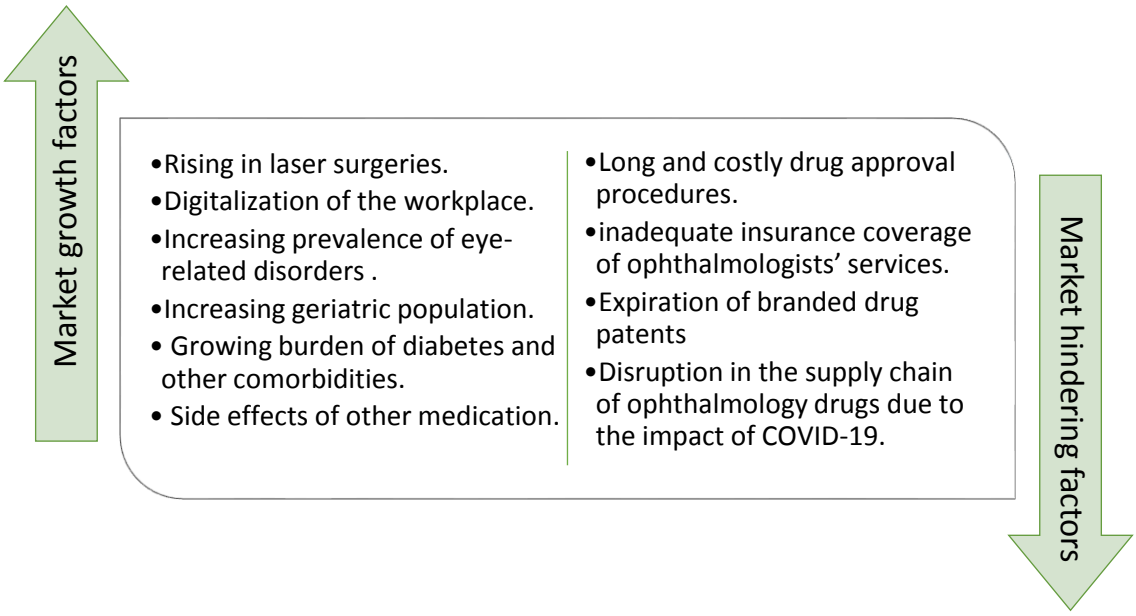

Figure 2 - Global Ophthalmic Market Variables

Ophthalmic drops form:

The most common form of ophthalmic drug is eye drops, which is classified Based on dose into single dose and multiple dose

A. **Multiple dose:** It's a glass or plastic bottle with a volume between approximately 5 ml and 15 ml, the bottle can be used for up to 1 month after opening, some brands may last longer after opening – up to 3 or 6 months before requiring disposal depending on the type of preservative used[2,2017]. This type of drops are suitable for frequent eye drop users.

Figure 3 – Multiple dose

[2] 8 Things You Need To Know About Eye Drop, POCKET PHARMACIST: Health & Medicine Info At Your Fingertips, https://www.pocketpharmacist.net/, 2017

B. **Single dose:** This is a small container made of plastic with a volume between approximately 0.3 ml and 1.0 ml[3,2017]. which contains exactly enough eye sterile solutions for one dose.

Figure 4 – Single dose

The choice of a single dose has been growth rapidly because of two crucial issues.

- **preservative-free:** almost all ophthalmic medication packaged in dropper bottles uses preservatives to maintain the quality of the medication. This ingredient can be harmful when used regularly to treat the symptoms. Often eye drops containing preservatives are likely to cause certain eye allergies, Burning Sensation, and repeated use can impair an individual`s sight. It is not necessary to add preservatives to single-dose
- **precise dosing:** Applying precise dosing in both eyes has always been a challenge with multi-dose dropper bottles. Fortunately, in single dosage the risks of overdose or medication error are easily avoided. The single doses make it possible to deliver the exact dose prescribed.

[3] OPHTHALMIC SQUEEZE DISPENSER – Eliminating the Need for Additives in Multidose Preservative-Free Eyecare Formulations, https://drug-dev.com/ , 2017

The choice of a single dose or multiple dose depends upon various parameters such as the efficacy of the drug, formulation, stability, and the course of treatment, and The market for both types is expected to grow positively over the coming years, as shown in the **Figure 5**[4,2019], therefor AFAQ makes sure to meet the market demands and customers' needs in both categories single and multi-dose by offering advanced solutions to produce each type of ophthalmic drops taking into consideration that the packaging process of ophthalmic drops is vital and there is no margin for error during the process.

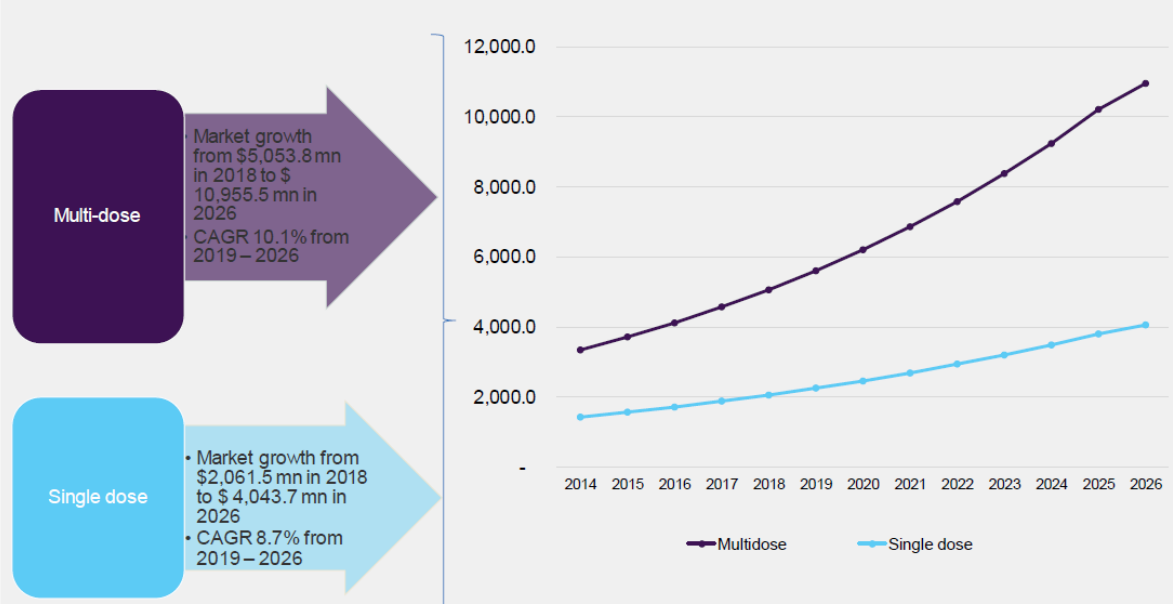

Figure 5 – Single and multiple Ophthalmic drops Market Forecast to 2026

AFAQ multiple dose filling machine: the machine is designed and built according to cGMP, the main filling system depend on peristaltic pump with filling accuracy less than ±2%. And tighten torque control and monitoring to meet the most restricted QA conditions.

Figure 6 – AFAQ multiple dose filling machine

[4] Ophthalmic Packaging Market Size, Share & Trends Analysis Report, By Dose (Single dose, Multi dose), By Type (OTC, Prescription), By Material (Plastics, Glass) By Region, And Segment Forecasts, 2019 – 2026: Grand View Research, 2019

AFAQ single dose filling machine: the machine is designed and built according to cGMP, the filling system based on piston pump driven by advanced servo systems, in order to have precise dosage ±0.5% for a very small filling volume started from 0.1 mL.

Figure 7 – AFAQ single dose filling machine

AFAQ will continue to develop solutions and optimize processes in pharmaceutical industries field for both compounding equipment and packaging machines according to the cGMP (Current Good Manufacturing Practices)requirements and international regulations and guidelines (FDA, EMEA, ISO), inspired by industry development and customers needs.

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