Manufacturing of Generic OTC and Prescription Aller-Flo
(Fluticasone Propionate Nasal Spray)

Overview

Aller-Flo (Fluticasone Propionate Nasal Spray) is a generic over-the-counter (OTC) and prescription medication commonly used to treat allergy symptoms such as congestion, sneezing, and runny nose. This document provides an in-depth look at the raw materials, manufacturing steps, and costs associated with producing Aller-Flo as a transparent reference for manufacturers, pharmacies, and healthcare providers using the DivvyHealth platform.

Raw Materials

The following raw materials are needed to manufacture a batch of **Fluticasone Propionate Nasal Spray**:

1. Active Ingredient

- **Fluticasone Propionate**:
  - Role: Active ingredient that reduces inflammation in nasal passages.
  - Quantity: 0.05% w/w (50 mcg per spray).
  - Cost: $5,000 per kg.

2. Inactive Ingredients

- **Microcrystalline Cellulose (and) Carboxymethylcellulose Sodium:**
  - Role: Thickening agent and stabilizer.
  - Quantity: 2% w/w.
  - Cost: $50 per kg.

- **Benzalkonium Chloride:**
  - Role: Preservative to prevent microbial contamination.
  - Quantity: 0.01% w/w.
  - Cost: $20 per kg.

- **Phenylethyl Alcohol:**
  - Role: Solvent and preservative.
  - Quantity: 0.25% w/w.
  - Cost: $80 per liter.

- **Polysorbate 80:**
  - Role: Emulsifier to maintain the consistency of the formulation.
  - Quantity: 0.02% w/w.
  - Cost: $100 per kg.

- **Sodium Phosphate (Monobasic and Dibasic):**
  - Role: Buffering agents to maintain pH stability.
  - Quantity: 0.1% w/w.
  - Cost: $10 per kg.

- **Purified Water:**
  - Role: Solvent for the nasal spray.
  - Quantity: 90-95% w/w.
  - Cost: $0.50 per liter.

Manufacturing Steps

Below is a general step-by-step process for producing **Fluticasone Propionate Nasal Spray**:

Step 1: Preparation of Buffer Solution
- **Objective**: Create a buffer solution to maintain pH balance in the nasal spray.
- **Procedure**:
  - Dissolve **Sodium Phosphate (Monobasic and Dibasic)** in **Purified Water**.
  - Adjust the pH to 6.0-7.0 using a pH meter.

Step 2: Suspension of Microcrystalline Cellulose and Carboxymethylcellulose Sodium
- **Objective**: Prepare a suspension that will act as a stabilizer and thickener.
- **Procedure**:
  - Add **Microcrystalline Cellulose** and **Carboxymethylcellulose Sodium** to the buffer solution.
  - Mix using a high-shear mixer for 30 minutes to ensure a homogenous suspension.

Step 3: Incorporation of Active Ingredient
- **Objective**: Add **Fluticasone Propionate** to the suspension.
- **Procedure**:
  - Gradually add the **Fluticasone Propionate** to the prepared suspension while mixing.
  - Continue mixing until the active ingredient is uniformly distributed.

Step 4: Addition of Preservatives and Emulsifiers
- **Objective**: Introduce preservatives and emulsifiers to maintain product stability.
- **Procedure**:
  - Add **Benzalkonium Chloride**, **Phenylethyl Alcohol**, and **Polysorbate 80** to the mixture.
  - Mix for 15-20 minutes at medium speed.

Step 5: Filtration and Sterilization
- **Objective**: Remove impurities and sterilize the formulation.
- **Procedure**:
  - Pass the suspension through a 0.2-micron filter to ensure sterility.

Step 6: Filling and Packaging
- **Objective**: Fill the nasal spray bottles with the formulation.
- **Procedure**:
  - Fill sterilized nasal spray bottles with the prepared suspension (e.g., 120 sprays per bottle).

- Seal the bottles with appropriate nasal spray pumps.
- Label and package the bottles for distribution.

Cost Breakdown

The following table outlines the estimated costs involved in producing **100 liters (1,000 bottles)** of generic **Aller-Flo** nasal spray:

Material	**Quantity for 100L**	**Unit Cost**	**Total Cost**
Fluticasone Propionate	0.05 kg	$5,000/kg	$250
Microcrystalline Cellulose & Carboxymethylcellulose	2 kg	$50/kg	$100
Benzalkonium Chloride	0.01 kg	$20/kg	$0.20
Phenylethyl Alcohol	0.25 L	$80/L	$20
Polysorbate 80	0.02 kg	$100/kg	$2
Sodium Phosphate (Monobasic/Dibasic)	0.1 kg	$10/kg	$1
Purified Water	90-95 L	$0.50/L	$45
Total Material Cost	**-**	**-**	$418.20
Labor (prep, mixing, and packaging)	**-**	**-**	$200
Sterilization & Filtration	**-**	**-**	$150
Packaging (for 1,000 bottles, pump, label, etc.)	1,000 units	$1.50 per bottle	$1,500
Shipping (for 1,000 bottles)	1,000 units	$0.25 per bottle	$250
Marketing (for 1,000 bottles)	1,000 units	$1.00 per bottle	$1,000
Regulatory Compliance & Filing Fees:	1,000 units	$10.00 per bottle	$10,000
Total Estimated Cost	1,000 units	$13.67	$13,668.20

Key Notes:

- **Shipping Costs**: Shipping is estimated at $0.25 per bottle, based on standard costs for distributing lightweight pharmaceutical products across the U.S.
- **Marketing Costs**: Estimated at $1.00 per bottle, this includes digital and traditional advertising, promotions, and partnerships to market the product.
- **Regulatory Costs**: Regulatory compliance is the largest additional cost, accounting for FDA filings, certifications, and ensuring the product meets all legal requirements for distribution in the U.S.

Detailed Breakdown of Regulatory Compliance & Filing Fees

Here's a detailed breakdown of the **Regulatory Compliance & Filing Fees** totaling $10,000 for producing **generic OTC and prescription Aller-Flo (Fluticasone Propionate Nasal Spray)**. These fees account for compliance with U.S. regulations, certification processes, and administrative costs.

1. FDA New Drug Application (NDA) / Abbreviated New Drug Application (ANDA) Filing Fees

- **Purpose**: These fees are required for approval to market a new or generic drug in the U.S. For generic drugs like Aller-Flo, an **Abbreviated New Drug Application (ANDA)** is typically filed.

- **Cost**: Approximately **$176,823** per ANDA in 2024, but smaller companies (those with fewer than 500 employees) may qualify for a **small business fee reduction**. This reduction can be up to 75%, reducing the filing fee to **$44,206**.

- **Allocated Fee for this batch**: Since the fee is a one-time cost, for a 100-liter batch, we'll allocate **$5,000** as part of the total $10,000 regulatory budget, assuming multiple production runs to amortize the filing fee over time.

2. Good Manufacturing Practice (GMP) Compliance Audits

- **Purpose**: Regular audits are required to ensure compliance with FDA's Good Manufacturing Practice (GMP) regulations. These audits can be internal or conducted by third-party auditors.

- **Cost**: **$2,500** for each audit, which includes internal compliance checks, documentation reviews, and periodic inspections by regulatory authorities or certified third-party auditors.

3. Labeling and Packaging Review

- **Purpose**: Ensures that all labeling, packaging, and product inserts comply with FDA regulations, including accurate dosage information, warning labels, and usage instructions.

- **Cost**: **$1,000** for legal and regulatory consultants to review and approve the labeling and packaging to ensure full compliance with FDA labeling regulations.

4. Stability Testing & Validation Costs

- **Purpose**: Required to prove the safety and efficacy of the product over its intended shelf life. Stability testing must be conducted under various conditions (temperature, humidity, etc.) to verify that the product remains safe and effective.

- **Cost**: **$1,200** for stability testing, covering laboratory fees for storing and testing the product under different environmental conditions over time. This cost is distributed across multiple batches.

5. Environmental Impact Assessment (if applicable)

- **Purpose**: Required by some regulatory bodies to assess the environmental impact of drug manufacturing, particularly for OTC products.

- **Cost**: **$300** for filing and documentation, assuming a simple assessment.

6. Drug Listing and NDC Number Registration

- **Purpose**: FDA requires all marketed drugs to be listed with the agency, and an NDC (National Drug Code) number must be assigned for tracking and identification.

- **Cost**: **$500** for drug listing and NDC registration, which includes the administrative costs associated with ensuring the product is properly listed in the FDA database.

Summary of Regulatory Costs

Regulatory Item	**Cost**
FDA ANDA Filing Fee (Amortized)	$5,000
GMP Compliance Audits	$2,500
Labeling and Packaging Review	$1,000
Stability Testing & Validation	$1,200
Environmental Impact Assessment	$300
Drug Listing and NDC Registration	$500
Total	**$10,000**

Explanation

1. FDA ANDA Filing Fee: This is the largest component of the regulatory cost, but since it is a one-time cost, we amortize it across multiple production runs to reduce the cost impact on a single batch.

2. GMP Compliance Audits: Regular audits ensure that the facility and production processes meet FDA standards, minimizing risks of non-compliance.

3. Labeling & Packaging Review: Ensures that all packaging meets regulatory standards and is ready for market.

4. Stability Testing: Demonstrates that the product remains effective and safe over its intended shelf life, a necessary part of regulatory approval.

5. Environmental Impact & Drug Listing: Additional necessary steps to meet FDA regulations and track the product in the market.

This breakdown provides a clear understanding of where the **$10,000** regulatory compliance budget is allocated, ensuring that the product is safe, effective, and meets all legal requirements for distribution in the U.S.

Summary

Producing **generic OTC and prescription Aller-Flo** involves precise sourcing of active and inactive ingredients, careful suspension, and sterilization processes. Based on the above estimates, the cost of production for 100 liters of the nasal spray would amount to **$13,668.20**, excluding shipping, marketing, and regulatory costs.

Steps for Including in Repository
1. Create a new file in your repository titled `manufacturing_aller_flo.md`.
2. Paste the above content into that file.
3. Commit the file to your repository with an appropriate message, such as "Added manufacturing process and cost breakdown for generic Aller-Flo."