

A woman with her hair in a bun is sitting at a table, holding a small white nebulizer cup. A young child is sitting next to her, breathing into the cup. The child is wearing a green patterned shirt. In the foreground, there is a larger white nebulizer machine with a blue tube. The background shows a kitchen sink and white cabinets.

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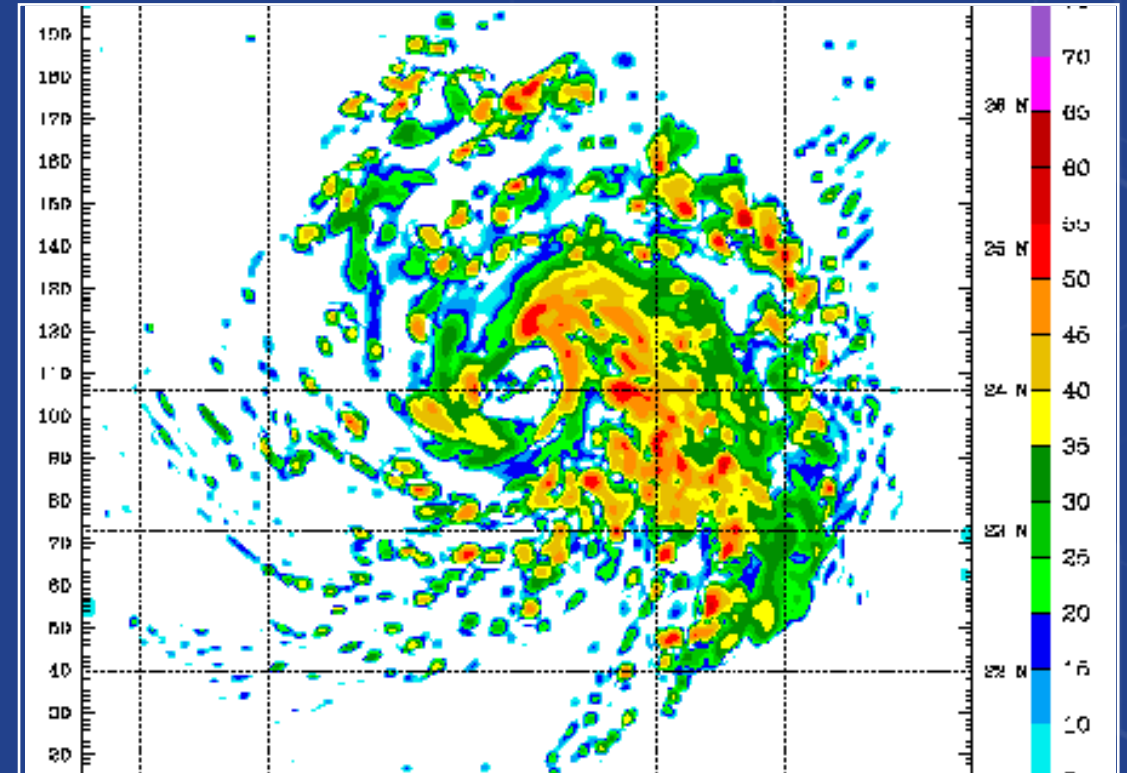
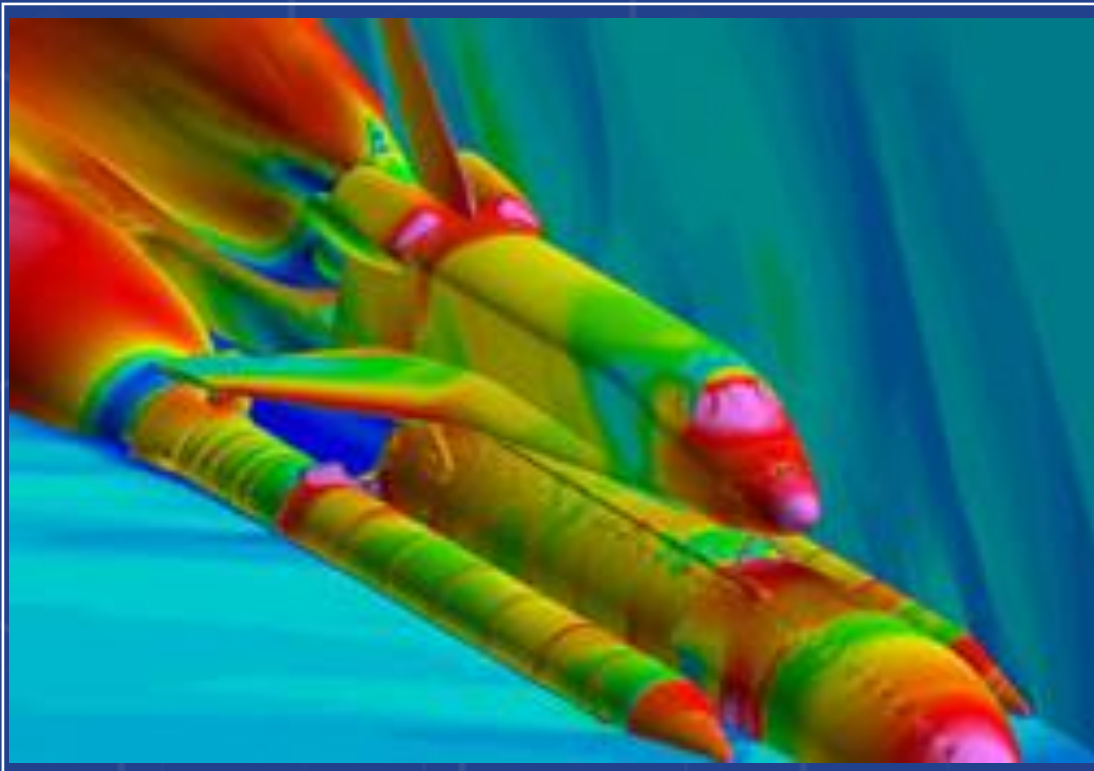
**MAPPING INVITRO DATA WITH
CLINICAL OUTCOMES IN GENERIC DRUG
DEVELOPMENT USING SIMBIOLOGY**

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SIMULATIONS IN RESEARCH AND DEVELOPMENT

Cipla

Aerodynamic simulations completed by computational fluid dynamics (CFD) experts over the last two decades were used to refine understandings of air loads on the SSLV and on thousands of protruding parts of the External Tank, Orbiter, and solid rocket boosters*



Weather Research and Forecasting model output showing simulated radar reflectivity (dBZ) for Typhoon Mawar at 3.3-km (2.1-mi) grid spacing**.

*NASA@SC11 Demo: Space Shuttle Aerodynamics and Debris Simulations

**Weather Research and Forecasting Model - Wikipedia

SIMULATIONS IN HEALTHCARE

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Predictive Data Analytics in Healthcare¹



Drug-Device Combination Development²

1.10 High-Value Use Cases for Predictive Analytics in Healthcare (healthitanalytics.com)

2. Cipla receives approval for Albuterol Sulfate Inhalation Aerosol (biospectrumindia.com)



Established in 1935, Cipla is a pioneer in the Indian pharmaceutical industry

Founded with a vision to make India self-reliant and self-sufficient in healthcare - Today, we have grown to become one of the world's largest generic pharmaceutical companies with an aim to augment the affordability and access of global health care

- 3rd largest in India¹
- 3rd largest in South Africa²
- Among the most dispensed generic companies in US³
- One of the world's Largest Inhalation portfolios
- One of the world's largest suppliers of anti-malarials
- 1 in 3 HIV patients take Cipla ARVs⁴
- Markets – 80+
- Revenue –17,132 crore

Cipla


85 YEARS
OF CARING



Cipla

CIPLA RESPIRATORY

**BREATHE.
THINK CIPLA.**

- 
- Cipla ranks **#2** in the sale of inhalers globally (by volume)
 - With presence in over **50** countries, Respiratory contributes **22%+** of total revenues.
 - Cipla's Fluticasone Salmeterol brand holds **1st** position in terms of market share by volume in FPSM market in... Morocco
 - Foracort brand stood at **#10** among the 4 Cipla brands that featured in the top 50 brands of Indian Pharma Market
 - **46%** share of volume in MDIs in South Africa respiratory market
 - **Synchrobreathe**, a state-of-the-art innovative breath-actuated inhaler, helping millions with **Obstructive Airway Diseases** such as **asthma**.

INITIAL EXPLORATION

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- In Vitro Data



- Clinical Outcomes

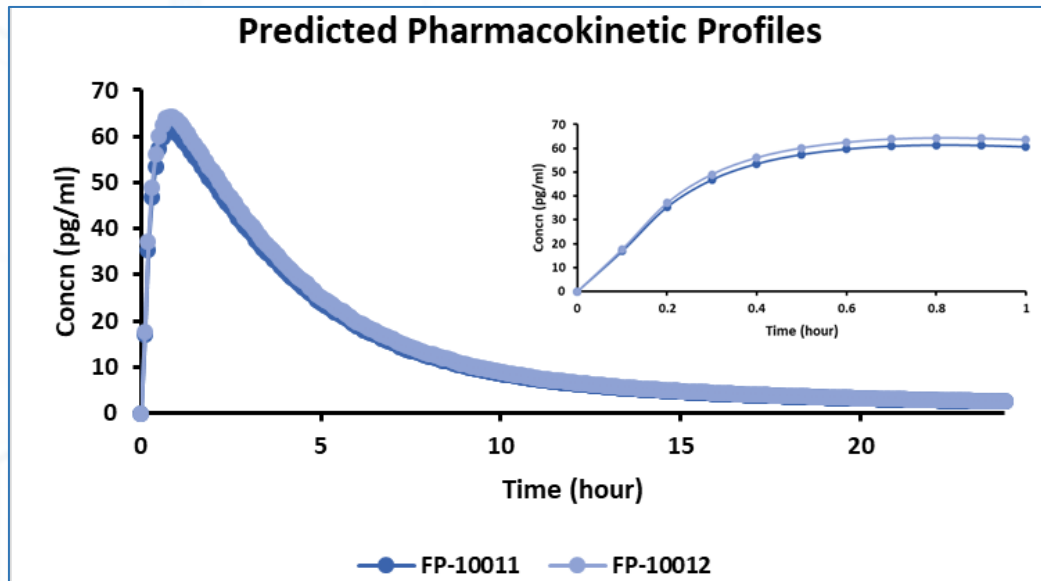


- Pharmacokinetic Modelling

Save Time and Cost

GENERIC DRUG DEVELOPMENT USING SIMBIOLOGY

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Inhalation PK Prediction

- Model was validated against the literature data adequately and was verified against a challenge case designed using in-house formulation developed.
- The model accuracy is 95% and more for oral inhalation and has specificity of more than 80%.
- The model enables early decision making in the planning of clinical trials, screening multiple formulations and drug delivery optimisation.

Batch ID	Predicted PK Cmax (pg/ml)	Actual PK Cmax (pg/ml)	Accuracy (%)
FP-10011	61.35	59.84	97.5
FP-10012	64.30	66.75	96.3

Model Input Parameters

- Drug specific Physico-chemical properties
- Human pulmonary physiology and parameters of delivery mechanism
- In-vitro data of delivered Fluticasone Propionate