

Advanced Product Design and Research
2020 Fall

OPlay



A Medical Product for
Children with Asthma

01 Background

more than

10 million

children in China have asthma

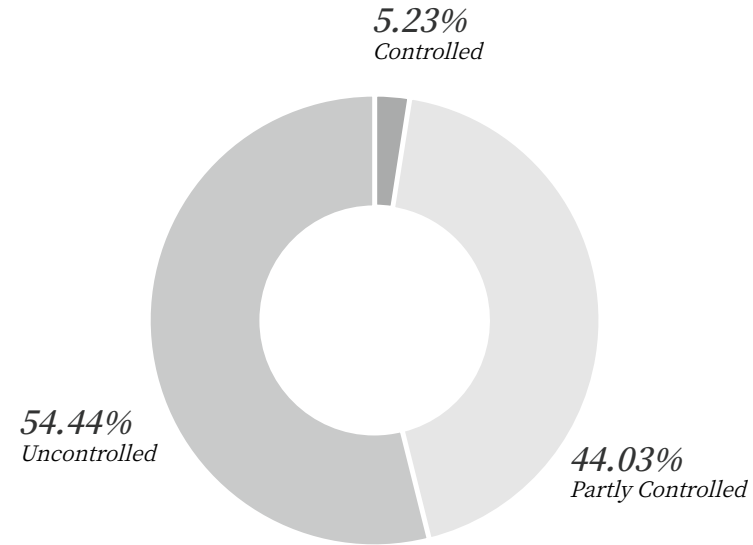
40% children and adolescents worldwide have varying degrees of asthma

80% process of asthma management need to be done by patients themselves



Asthma is the most common chronic disease among children worldwide. More than 339 million people are living with asthma. Treatment and effective management of asthma saves lives.

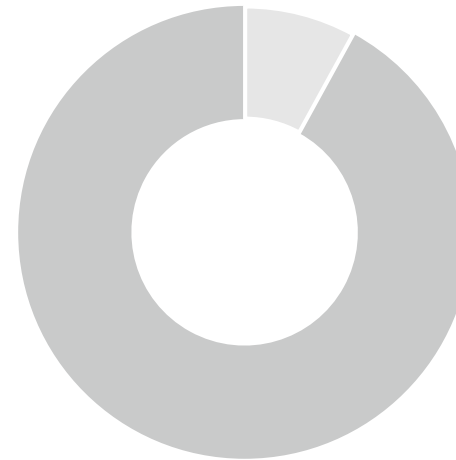
data from *World Health Organization*



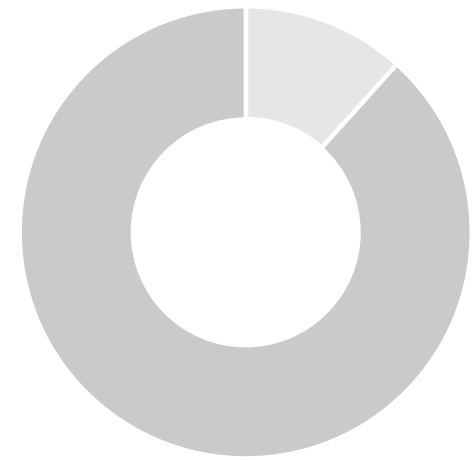
Only **5.23%** of children's asthma is controlled in Asia Pacific ^[1]



38% Asthmatic children was diagnosed with anxiety disorder ^[2]



92% overall and critical error across inhaler devices ^[3]



only **11.67%** asthmatic children and parents know about PEF ^[1]

Reference
 [1] *The Survey of the use of inhalers in Asthmatic Children*
 [2] *Analysis on status and related factors of anxiety of asthma children*
 [3] *Device errors in asthma and COPD: systematic literature review and meta-analysis*

02 Field Research

The primary methods of medication delivery are inhalation devices. Inhaler device errors are common and may impact the effectiveness of the delivered drug.

Children aged over 5 years old are recommended to use Pressurized metered-dose inhalers (pMDI) with spacers. So we tested the process of using pMDI.



01 insert the mouthpiece of the inhaler into the back of the spacer



02 shake the spacer and inhaler 4-5 times



03 breath out

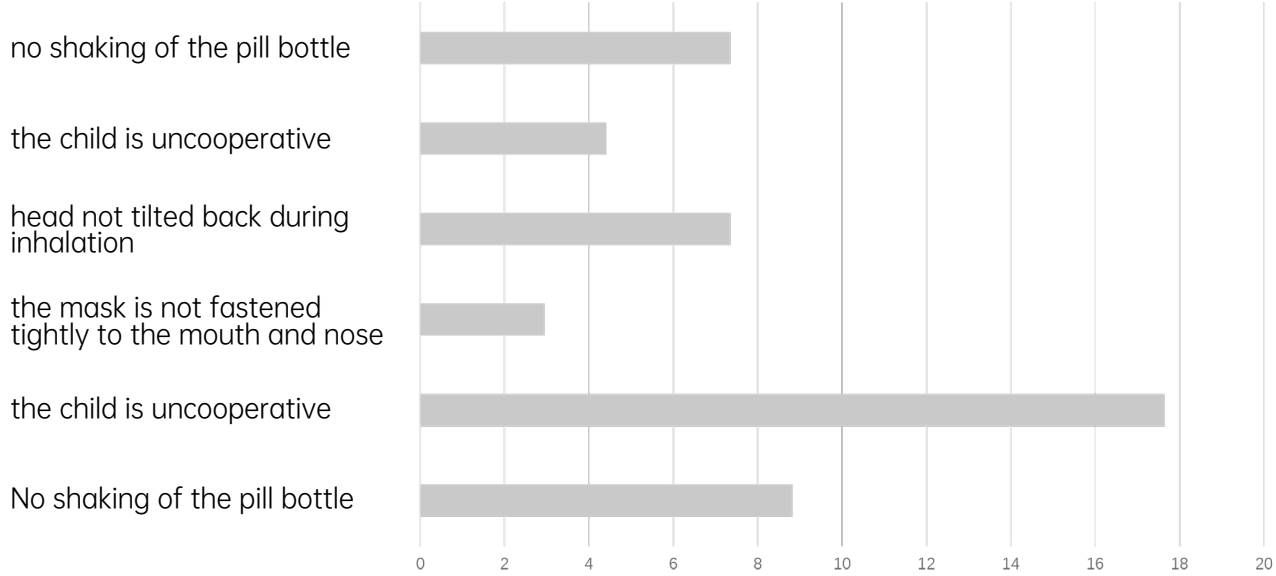


04 spray one puff of medicine into the spacer and begin to inhale slowly



05 hold breath for up to 8 seconds and then breathe out

Percentage of patients of pMDI+spacer making serious inhaler error^[1]



Summary

Error rates were high across inhaler devices. It's hard for children to use inhalers correctly.

Reference
[1] The Survey of the use of inhalers in Asthmatic Children

03 Insight

Painpoints

Affect Self-acceptance

For children, symptoms like stridor, and complex treatments may affect their experience of therapy, and even self-acceptance.

Hard to use inhaler correctly

The process of using inhaler devices is complex and it is hard for children to use it correctly.

Monitoring is ignored and complex

For children, the medication and monitoring of asthma is hard. They always need to use several products.

Opportunities

A more fun way to use the inhaler device

Use with guidance and feedback

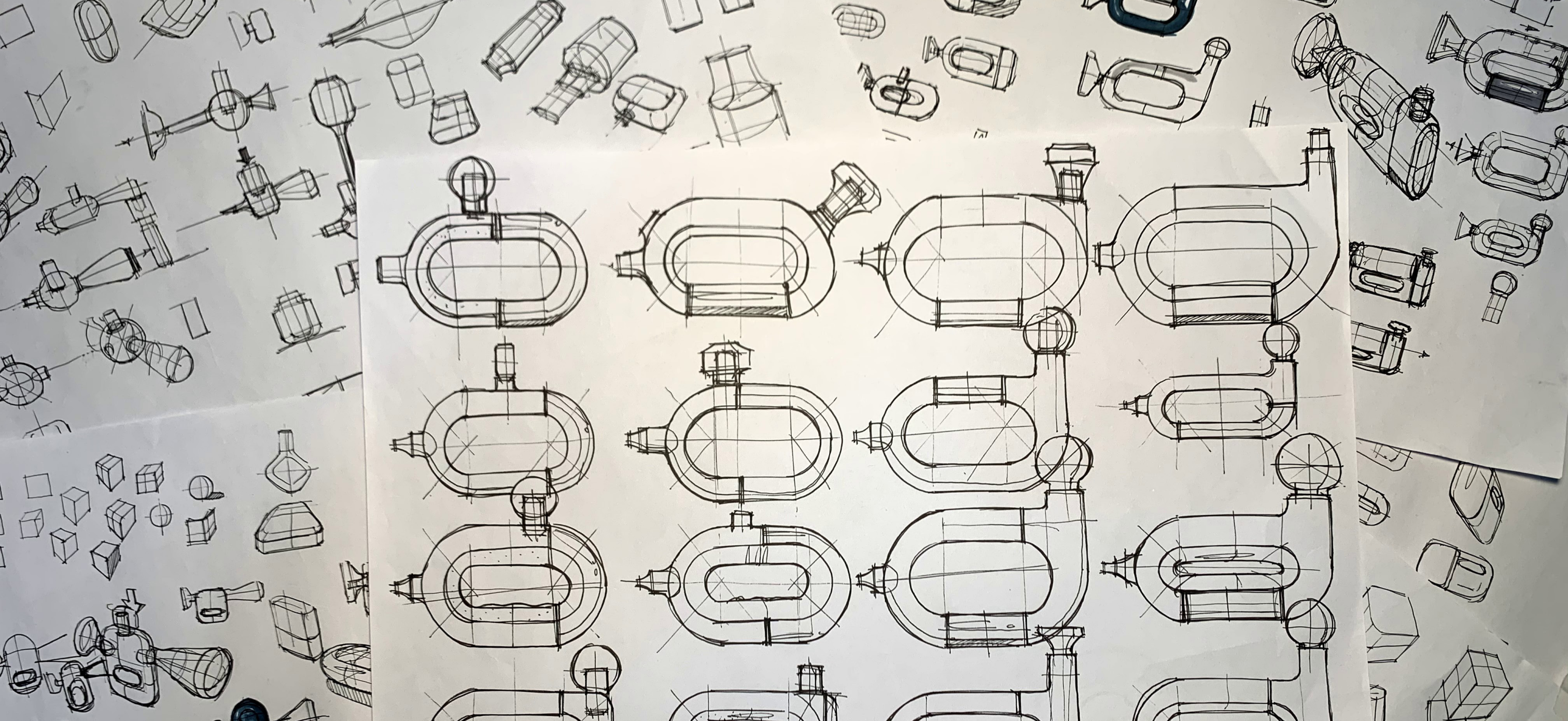
A simple management system

What if

children with asthma can use their medical devices in confidence and be directed just like a player?



04 Sketch



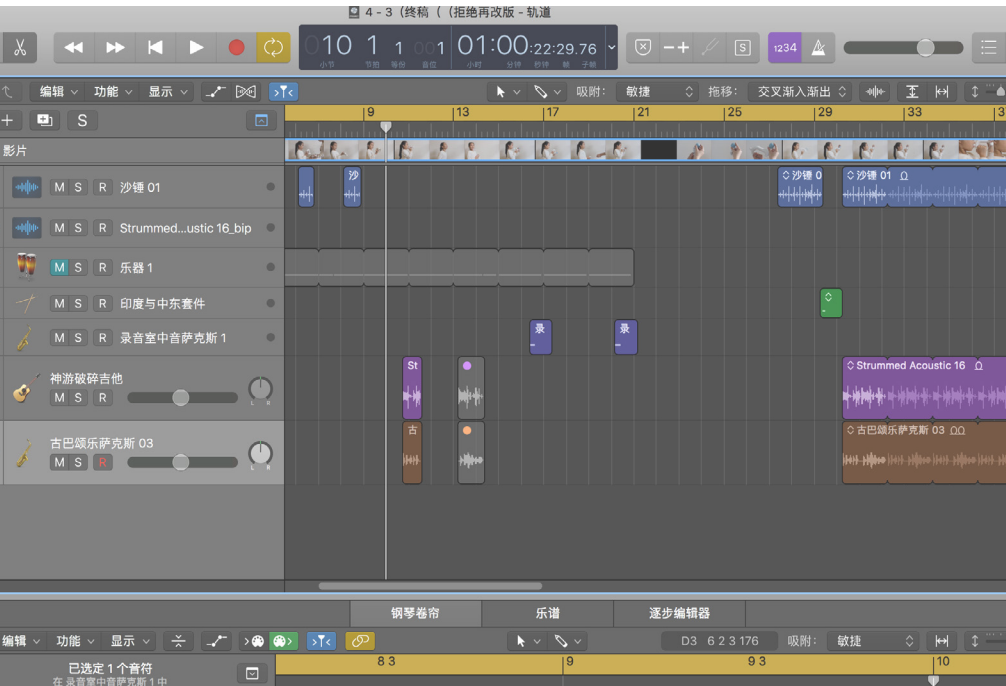
05 Prototype



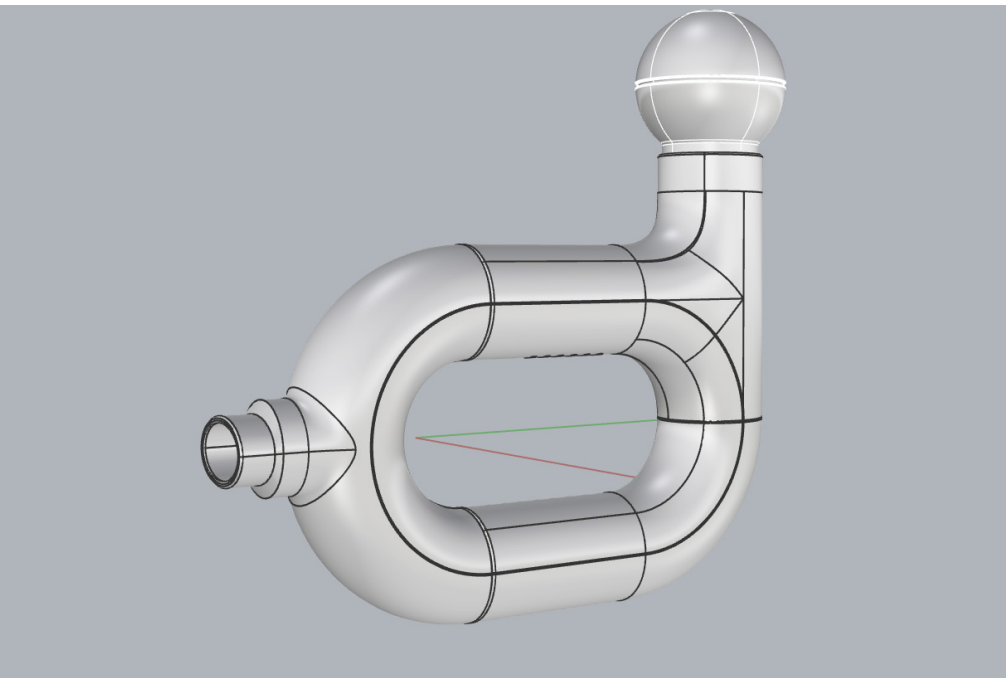
We made some prototypes by 3D printing to test different forms.



We invited some children aged from 5-9 years old to test different prototypes.



Music Production



3D Modeling



Prototype





OPlay

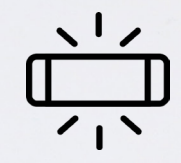
BREATHE A SONG

OPlay integrates the playing of musical instrument into the use of medical products, with two functions of asthma spacer and peak flow measuring. For children, the medication and monitoring of asthma is hard. Complex treatment and symptoms, like stridor, may affect their experience of therapy and even self-acceptance. By transforming the complex process into several simple steps, matching with lighting guidance and music feedback, OPlay makes the tedious therapy a joyful recital presented by children, which helps to improve body and mental health. Users can track measuring records on the app, and do some changes on songs to unlock new recitals.

MORE THAN PLAY



Inhale with
Music



Use with
Feedback



Manage with
Convenience

06 Using Flow

-01- Exhale



Exhale through Oplay and activate it. OPlay can measure the peak flow, and give a feedback of asthma condition on the spot, with melodies and lighting.

*Peak Flow Test

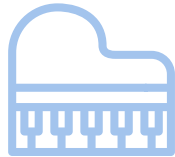
-02- Shake



Shake OPlay to activate it and mix the medicine. OPlay will make a sound of percussion music. The music will be louder when shaking is harder.

*Medication Process

-03- Press



Press the blue ball to let the dose out. OPlay gives a 'Ding' to get children ready for inhaling.

-04- Inhale



Inhale the dose, and OPlay will make a melody of wind music to guide children to breathe. And the end of music informs that medicating process is terminated.

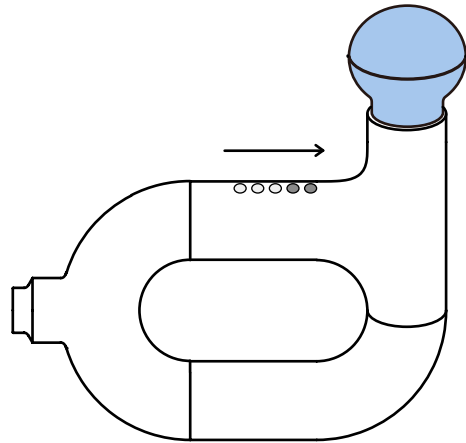
Feedback with Music

We divide the process of using inhaler into some steps. When children do the right operation, OPlay will play the corresponding music, just like playing the instrument.

06 Using Flow

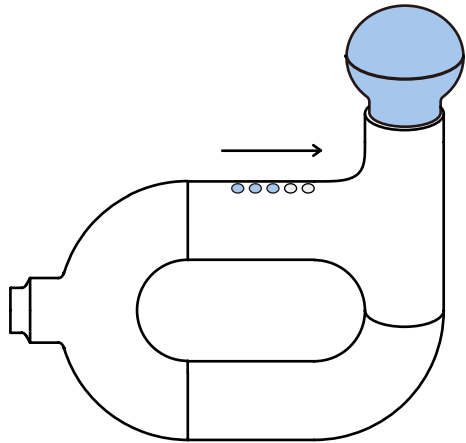


*Indicator Lights
light up*



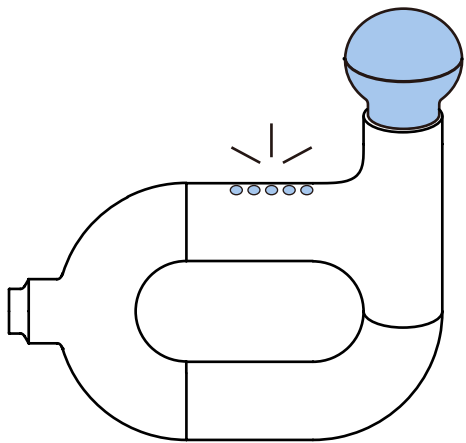
01 Shake

The lights light up one by one to indicate that the product is activated



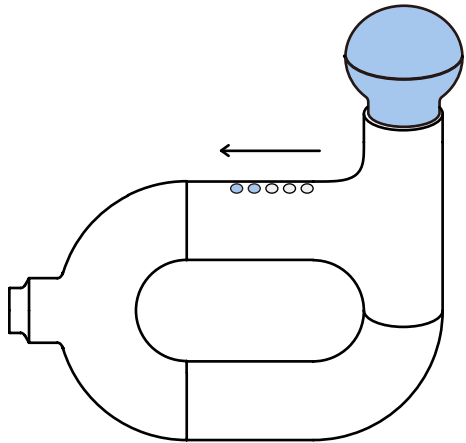
02 Exhale

The blue lights light up in the direction of exhalation



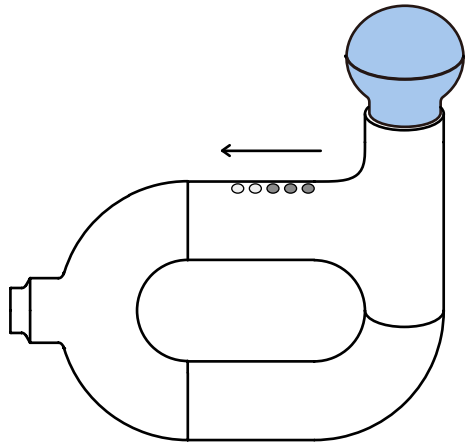
03 Press

Blue lights flash to indicate pressing the button to spray one puff of medicine



04 Inhale

The white lights light up in the direction of inhaling



05 Hold the Breath

The lights go out one by one in 8 seconds to indicate breath-holding

Indicate with Light

The operation time and operation of breath is guided by light on the top of the OPlay to help children do medicating and testing more accurately and happily.

07 Features



Comfortable
Grip



Multi-
Functional

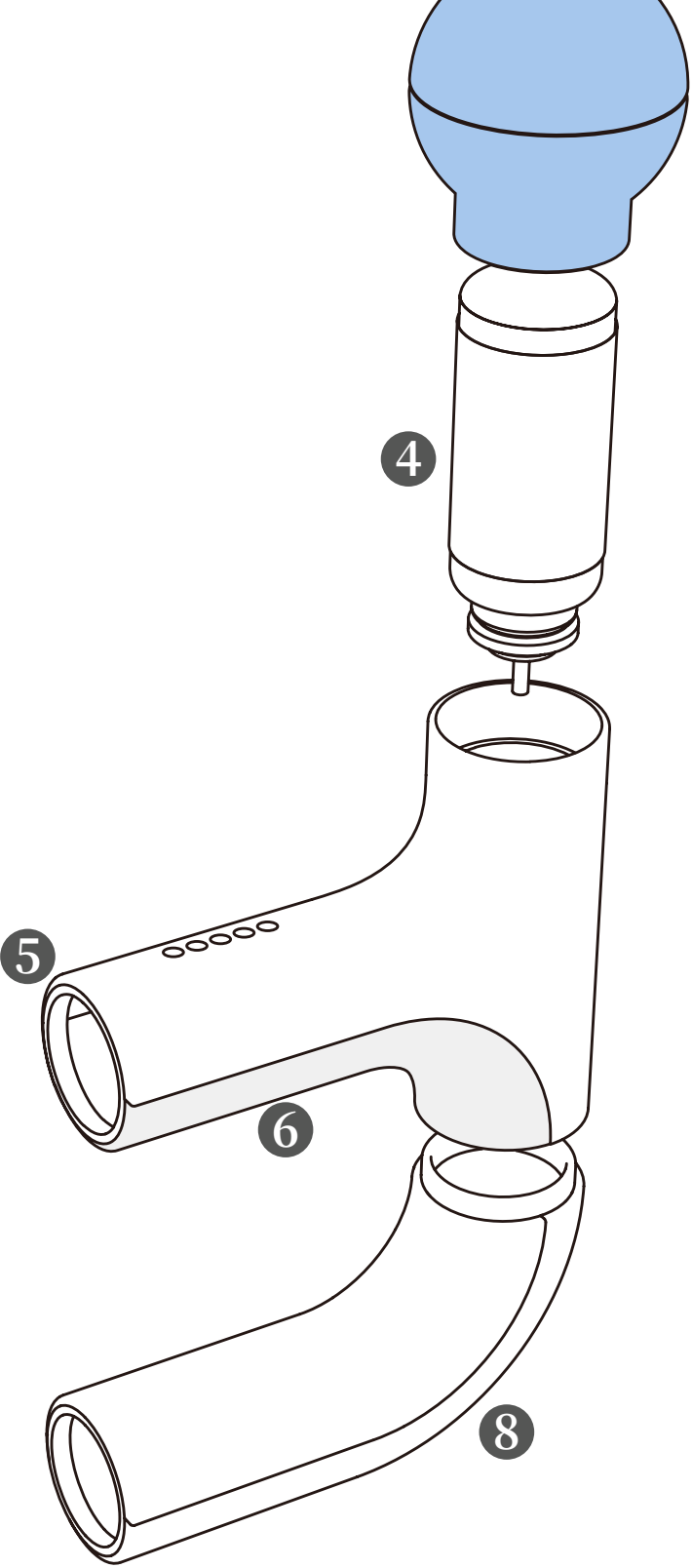
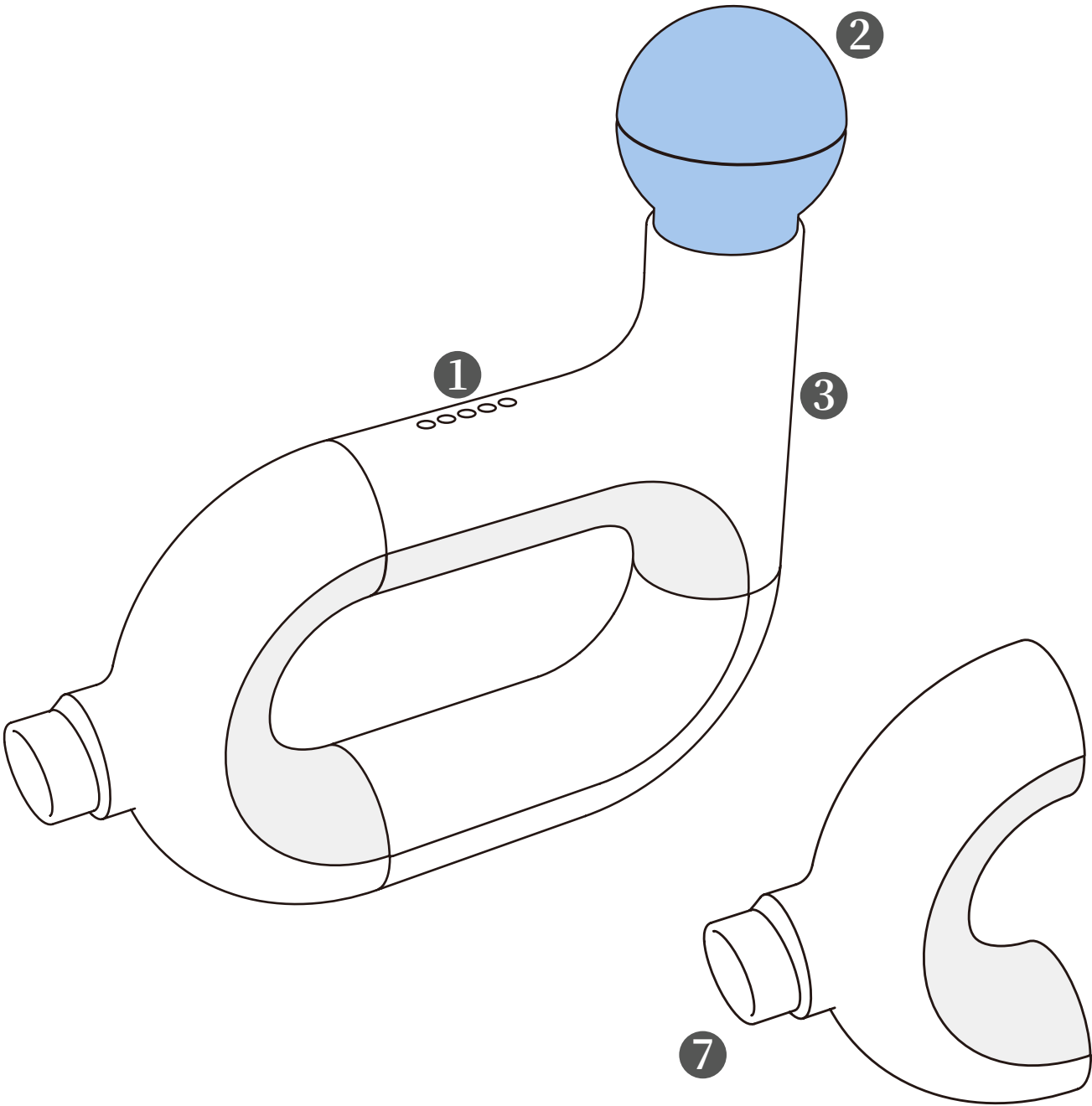
Adaptable
Mouthpiece



Flexible
Disassembling



08 Details



- 1 Indicator Lights
- 2 Button
- 3 Canister
- 4 Medicine
- 5 Peak Flow Meter
- 6 Speaker & Vent
- 7 Mouthpiece
- 8 Asthma Spacer
* Removable for Cleaning

09 User Interface

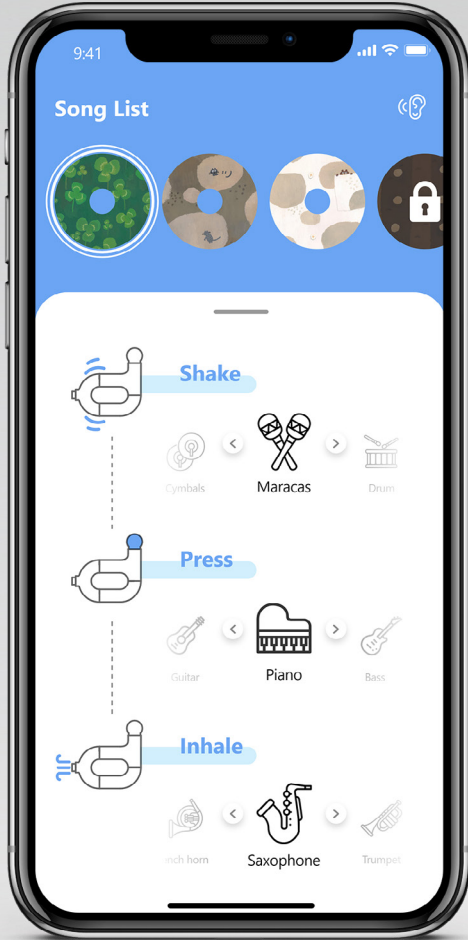


Home Page



Daily Report

The daily PEF level is recorded



Music List

Choose more instruments and music to make OPlay more fun to use

MORE RECORDS
MORE SONGS





Hope happiness and health constant!

Thanks.