Breakout Session # A
12:45 – 1:25

New Methods of Medication Delivery to the Lungs: Say Goodbye to the MDI as we know it
Michael J. Welch MD, FAAP, FAAAAI, CPI

Co-director, Allergy & Asthma Medical Group & Research Center
Member, Division of Allergy/Immunology/Rheumatology,
Rady Childrens Hospital San Diego

Clinical Professor, University of California,
San Diego School of Medicine

5776 Ruffin Road
San Diego, CA 92123
(858) 292-1144 office
Disclosures

- Research Center has received grants from:
  - TEVA
  - GSK
  - Merck
  - Meda

- Speakers bureau
  - Merck
  - TEVA
Assume everyone has poor inhaler technique!!

Just ask Dr. House

Video here
Where we going?

- Overview – brief hx of delivery systems
  - “We’ve come a long ways”
  - First MDI
- Newest delivery devices/systems
  - CFC to HFA story
  - Respimat story
  - Latest on nebulization
  - New DPI’s Respiclick
  - The “smart” MDI
  - Future
- opium
- stramonium (Jimson weed)
- belladonna (deadly nightshade)
iodine, conium (hemlock), oxygen, hydrogen, nitrogen, nitrous gas, a great variety of gums and balsamic resins, boiling tar, hydrocyanic acid, camphor, ammonia, balsam tolu, naphtha, chlorine, hyoscyamus, lactuca,, digitalis, colchium, galbanum, vinegar, nitre, lobelia inflata, ipecacuanha
Quick Safe
asthma relief

Asthma Nefrin

Pocket Set $6.75 Complete
Susie Story

- 1955
- Susie, daughter of Geoge Maison
  - Asthma
  - Used hair spray
- President, Riker
- Perfume device
- 1956 – 1st MDI
  - Medihaler–epi
  - Medihaler-iso
At Last...
UNIFORM DOSAGE NEBULIZATION
in Asthma

MEDIHALER™

with Your Favorite
Bronchodilator*

- NO RUBBER BULBS TO DETERIORATE
- NO BREAKAGE OF COSTLY
  GLASS NEBULIZERS
- NO SPILLING OF SOLUTION IN
  POCKET OR PURSE

Available with either
isoproterenol
or epinephrine

Medihaler-ISO™

Medihaler-EPI™

True nebulization—80% of particles from \( \frac{1}{4} \) to 4 microns radius. Amount of medication
released does not depend on pressure applied—
dosage always the same. One application
usually sufficient for most patients.

Medihaler Oral Adapter is
nonbreakable. Vial of
Medihaler medication is
leakproof, spillproof,
provides 200 applications.
Economical.

- *MEDIHALER-ISO™
  0.3% solution of isoproterenol
  HCl U.S.P.

- *MEDIHALER-EPI™
  0.3% solution of epinephrine
  HCl U.S.P.

On your prescription, be sure to write
“Medihaler-ISO (or Medihaler-EPI)
AND Medihaler Oral Adapter,” since
medication cannot be used without
Adapter. For refill write for medica-
tion only.

Another First from
Riker

1957
Inhaler delivery systems

- **pMDI**
  - HFA
  - Autohaler
  - Respimat
- **DPI**
  - single-dose
  - multi-dose
- **Nebulizer**
  - Jet
  - Non-jet
CFC to HFA conversion

- Montreal Protocol 1987
- Ban of CFC’s (chlorofluorocarbons)
- New HFA inhalers
- Certain HFA inhalers
  - Solutions not suspensions
  - Better lung deposition
    - From 15-20% range to over 50%
  - QVar, Aerospan, Alvesco
Lung deposition

HFA BDP (Qvar) & fluticasone (Flovent)

ciclesonide (Alvesco), flunisolide HFA (Aerospan) depositions similar

Dry Powder Devices (DPI’s)

- Main aerosol MDI problem: coordinating actuation with inhalation
- Spacers help (do not solve all problems)
- Aerosols = powder + gas
  - Why not just suck the powder?
- Various DPI’s
  - Diskus, Flexhaler, Ellipta, Handihaler
  - Inhale fast
- DPI’s in USA only for controller rx
Convenient device AND dosing

- **Ellipta**
- Simple device
- Once-a-day dosing
  - Vilanterol
  - Fluticasone furoate
1st dry powder rescue inhaler

- Respiclick
- 1st DPI rescue (albuterol) inhaler
- 1 puff DPI = 1 puff pMDI (~100 mcg)

No:
- Shaking
- Coordination
- Spacer

- Built-in counter
- Open, click and inhale
Soft Mist Inhaler

- Respimat
- Very small portable “nebulizer”
- Propellant-free, multi-dose device
- Liquid formulation
- Slow moving aerosol (1/10 speed of pMDI)
- Lung deposition 2 to 3x of pMDI
- Higher patient preference over MDI & DPI
- Available for Spireva, Combivent, Stiolto
eFlow technology

- Electronic nebulizer
- Vibrating mesh
- PARI (leaders in nebulizer technology)
- eRapid nebulizer
  - All nebulized medications
  - Pulmozyme studied with eRapid
- Nebulizer time: 2 to 3 minutes!!
THE SMART MDI

AUTOMATIC TRACKING
Easily monitors multiple medications and glows to provide dose reminders

UNIVERSAL DESIGN
Ergonomic design fits securely on metered-dose inhalers (MDIs)

WIRELESS SYNCING
Wirelessly and automatically syncs to your smartphone

Gecko device
Future

- Even SMARTer MDI (built-in)
- Faster, portable nebulization
- Biologics delivered by an MDI
- Non-respiratory drugs delivered via lungs (e.g. insulin; Afrezza)