2\textsuperscript{st} Medical Valley Inhalation Symposium
The future of inhalation

16 October 2013
09.00–17.00
Medicon Village, Lund, Sweden

inhalationsymposium.com
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NNE Pharmaplan
pharm-analyt Labor GmbH
Establishing AZ Inhalation Product Development on the West Coast of Sweden (Gothenburg area)

How did it all start and how did it go?
~110 people relocated to PharmDev in Mölndal
Lund 50, UK 20, Södertälje 40

Multi-cultural PhDev Inhalation Teams (~80 AZ)

AZ + new recruits today represent
• Sweden
• UK
• Ireland
• France
• Finland
• Germany
• US

Sites Closure Announcement - March 2010
In 2012 followed by closure of R&D in Södertälje

Flow from 3 R&D site
(2 inhalation sites)
The New Home – Mölndal (Gothenburg area)

~2300 people work at the R&D site in Sweden
Do I want to move? Where to live?

Guided tours from UK and Lund were arranged

.....meanwhile the builders were preparing for the labs
AZ Mölndal validated a brand new GMP facility (LF) of 10 000m² (for tablets and capsules, etc.)

AZ announce movement of all inhalation to Mölndal – make room for “2 old sites” (Lund and Charnwood) – arrival in 18 m!!

Very complex situation - two consultant firms hired to support R&D strategy and execution of transformation

7000 m² required – high demand on RH control

First layout of new lab

Identified duplicated equipment

Squeezed analytical labs (“tidy up lab areas”)

FINALLY 5500 out of 7000 m² offered
Ventilation systems are complicated things!

Removal of 1600 kg H$_2$O / h possible in the new inhalation labs
First estimate (15 M$) based on very limited information

Q1 2010

- Detailed lab layouts incl area need after 1st estimate
- RH capacity calculations – completely new AND huge ventilation system
- Need to use outdated lab areas - required new floors and outer walls.....

Updated estimate (23 M$)

- Changed timelines – need to move FASTER to enable people transfer in time for school; August instead of Q4 2011
- Up to 120 builders working in parallel in the same facilities....
- Design&building in parallel – need to repeat failed work

Updated estimate (40 M$)

- Lengthy budget negotiations...., time-out
- Meanwhile builders moved to other jobs, difficult to re-employ after budget approval – even more firms into the process....

- Up to 120 builders working in parallel in the same facilities....
- Design&building in parallel – need to repeat failed work
Multi-tasking – multi-skills.....

I WAS HERE FIRST!!
PhDev Site Transfer Teams were formed at all sites

- **Projects**: 27 Inhalation Projects
- **Facilities**: 7000 m² needed!
- **Equipment**: 400 pieces, 50+ systems to handle
- **IS/IT systems**: ~400 persons to handle
- **People**: Knowledge & Training, 450 mandays on training 1st year
- **Several kms of shelves to empty**
Many difficult decisions – can’t move everything

Would this one perhaps be too much for our new colleagues?...?
**KNOWLEDGE Retention&Transfer, Global Taskforce**

- **Expertise**, and **skills** acquired by a person through experience or education; the **theoretical or practical understanding** of a subject

Critical to comply with business, legal & regulatory requirements

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**GRAD – Global Retention & Disposal Schedule**

- Archive
- Transfer
- Discard

Only in Lund
1500 m of shelves to empty = 24 000 binders
• Secondment to closing sites
• Inhalation Workshops
• Seminar Series
• Device demonstrations
• Hands-on training in labs
• Specific training courses
• Technology and knowledge transfer to Mölndal via short term contracts (critical projects)
• Mentorship
• Meetings with patients

20+ delegates at MVIC´s Inhalation Symposium today!
Inhalation development in PharmDev today

• Inhalation Team ~80 people based in Mölndal
• Consultants working both at site and off site
• Ex-AZ employees working as consultants
• Collaborations with external research companies
• CROs
• Support from Operations, Södertälje (long inhalation history)
PT003 LABA/LAMA (pMDI)
• Formoterol fumarate and glycopyrronium for COPD treatment.
• A global Phase III programme has been initiated
• Pearl’s novel co-suspension formulation technology including PulmoSphere® porous particles.

• The porous particles are associated with the micronised drug particles forming a so called co-suspension.

PT010 LABA/LAMA+ICS (pMDI), triple product in development
### Inhalation in AZ (Mölndal and Pearl) today

<table>
<thead>
<tr>
<th>Dry Powder Inhalers</th>
<th>pMDIs</th>
<th>Nebulisers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ph1</strong></td>
<td>8848 (TLR7), 7624 (ip38)</td>
<td>Formoterol/Glycopyrronium/ICS, pMDI</td>
</tr>
<tr>
<td><strong>Ph2</strong></td>
<td>2115 (MABA), 5423 (SGRM)</td>
<td></td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>Formoterol/Glycopyrronium, pMDI</td>
<td></td>
</tr>
<tr>
<td><strong>Line extensions</strong></td>
<td>Symbicort pMDI, Breath Actuated Inhaler</td>
<td></td>
</tr>
</tbody>
</table>

- **New devices in development**
- **Oral and injected drugs in development for asthma/COPD**
Gothenburg takes care of its immigrants!
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Inhalation from a patient and clinical perspective

Nebulisation in clinical practice and drug development

Lars-Göran Carlsson M.D.
AB KAMSACO
The short history of nebulisation
Verona Pharma plc is a biotechnology company dedicated to discovering new drugs for the treatment of chronic respiratory diseases, such as chronic obstructive pulmonary disease (COPD), asthma, allergic rhinitis (hay fever) and cough.

- **Jan-Anders Karlsson, PhD**
  Chief Executive Officer

  Dr. Karlsson has been CEO and a director of Verona Pharma since June 2012. He has over 30 years of experience in the pharmaceutical industry, with many successes in the drug discovery and development areas in both large pharmaceutical and biotech companies where he built entrepreneurial drug discovery and development cultures. Before joining Verona Pharma, Jan-Anders was the CEO of S*BIO Pte Ltd in Singapore from 2005, which discovered 6 novel drug candidates and brought the lead JAK2 inhibitor pacritinib to phase 3 and the HDAC inhibitor pracinostat to phase 2, raised venture funding and established multiple international drug-development and commercial partnerships. Prior to joining S*BIO, Jan-Anders was the Executive Vice President, Global Research of Bayer Pharma, where he was a member of the Executive Management Committee and responsible for the company’s global drug discovery organization. He worked with Bayer from 1996 and before this he held management positions with increasing responsibility in Rhone-Poulenc Rorer from 1990 to 1996 and Astra AB from 1979 to 1990.

- **Graham Brown, PhD**
  Head of Development

  Dr. Brown is an expert in clinical development strategy and clinical operations. Graham has held senior R&D positions in Glaxo, Novartis, Pharmacia, Pfizer and UBC and has been involved in the development of a number of commercialised drugs.

- **Kathy Banner, PhD**
  Senior Scientist, Development

  Dr. Banner is a highly experienced pharmacologist, with a strong background of working in respiratory diseases. Kathy has held senior research leadership positions at Pfizer and Novartis and has experience of working across various stages of the drug discovery process from idea generation through to clinical development.

- **Peter Spargo, PhD**
  Head of CMC and Manufacturing

  Dr. Spargo is a highly experienced process and manufacturing chemist. Peter has held senior CMC and manufacturing development roles in both large pharma and biopharma companies and has been involved in the CMC development of a number of commercialised drugs.

- **Danny Lowe, CMA**
  Chief Financial Officer

  Mr. Lowe is a Certified Management Accountant (Canada) with extensive accounting, finance and tax experience, dealing with the complexities of both public and private corporations. Over the past 12 years, Danny has served as Chief Financial Officer for several public companies in the drug discovery, alternative energy and mineral resources sector. He was appointed Chief Financial Officer of Verona Pharma in 2006 with responsibility for overseeing the company’s finance operations.
RPL554

• Verona Pharma's lead drug, RPL554, is a "first-in-class" inhaled drug for chronic obstructive pulmonary disease (COPD), and potentially asthma and allergic rhinitis. The drug is an inhibitor of the phosphodiesterase 3 (PDE3) and phosphodiesterase 4 (PDE4) enzymes, two enzymes known to be of importance in the development and progression of immunological respiratory diseases. The drug has the potential to act as both a bronchodilator and an anti-inflammatory which would significantly differentiate it from existing drugs.

• RPL554 was selected from a class of compounds co-invented by Sir David Jack, the former Director of Research at Glaxo who led the team that discovered many of the commercially successful drugs in the respiratory market
Preclinical

PHASE I

Tox studies

PHASE II

Efficacy/Safety in HV, Asthma, Rhinitis patients

PHASE III

Safety in higher doses

Repeated dosing 6 days in asthmatic patients

Safety and efficacy in COPD patients

LPS study in healthy volunteers
Questions

- Formulation
  - Suspension
  - Solution
- Device
  - Jet
  - Ultrasonic
  - Mesh
  - SVN
- Disease
- Population
- Progress nebulisation
- Switch to DPI or pMDI
Use of Nebulisers

• Drug delivery
• Ventilation
• Mucociliary clearance
• Epithelial permeability
• Airway reactivity
• Cough threshold
• Lung cell sampling-sputum induction
Clintrialtrial.gov-nebulisation by phase

- Phase II
- Phase III
- Phase I
- Not spec
Why nebulisation?
Treatment with nebulisers - indications

The aim of treatment with nebulisers is to deliver a **therapeutic dose of the drug as an aerosol in the form of respirable particles** within a fairly short period of time, usually **5–10 minutes**.

Nebulisers are useful when **large doses of inhaled drugs are needed**, when patients are too ill or otherwise **unable to use hand held inhalers**, and when **drugs are not available in hand held inhalers**.
The commonest indications:

• Emergency treatment of asthma and exacerbations of chronic obstructive pulmonary disease (COPD).

• Other indications include the long term bronchodilator treatment of chronic airflow obstruction;

• Prophylactic drug treatment in asthma and symptomatic relief in palliative care.

• Antimicrobial drugs for cystic fibrosis, bronchiectasis, and HIV/AIDS;
Nebulisation for whom?
Device/age-range adapted from NAEPP guidelines

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;5 years</td>
<td>DPI/MDI</td>
</tr>
<tr>
<td>&gt;4 years</td>
<td>MDI/Spacer</td>
</tr>
<tr>
<td>≤4 years</td>
<td>MDI/Spacer/Facemask</td>
</tr>
<tr>
<td>≤2 years</td>
<td>MDI/Spacer/Facemask</td>
</tr>
</tbody>
</table>

GINA guidelines

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4 years</td>
<td>MDI/Spacer/Facemask</td>
</tr>
<tr>
<td>4-6 years</td>
<td>MDI/Spacer/Mouthpiece</td>
</tr>
<tr>
<td>&gt;6 years</td>
<td>DPI/BAI/MDI+Spacer</td>
</tr>
</tbody>
</table>

Nebulizer

Nebulizer with facemask

Nebulizer with mouthpiece
• Elderly patients with asthma or COPD, who might benefit from treatment with a nebuliser, should be assessed and managed in the same way as younger patients.
• Treatment with high dose β agonists should be used with caution in elderly patients with known ischaemic heart disease.
• Mouthpieces rather than face masks should be considered in elderly patients susceptible to glaucoma and using high doses of anticholinergic drugs.
Nebulisation when?
Treatment of severe COPD and exacerbations is........

Increasing existing treatment.................................B-agonists, theophylline

Adding treatment..................................................Bronchodilators, antibiotics, oral corticosteroids, diuretics, oxygen

Changing administration form

Inhalation to oral..............................................corticosteroids
Inhalation form................................................pMDI to Nebulized
Oral to i.v........................................................Diuretics, corticosteroids, theophylline

Supporting respiration............................................NIV, respirator
Hospital discharges and hospital stay in US

- The median LOS was 6 days (95% CI 6 to 6) while the mean was **9.8 days** (95% CI 9.1 to 10.5) Blackpool, North West England, admitted to the local hospital with COPD. *(Agboado BMJ 2012)*

- Mean hospital stay **4.8 days** *(Healthcare cost and utilization project 2011)*

- An estimated **672,000 hospital discharges were reported in 2006**; a discharge rate of 22.5 per 100,000 population. COPD is an important cause of hospitalization in our aged population. Approximately 64% of discharges were in the 65 years and older population in 2006. *(American Lung association 2012)*

- In 2008, there were about **822,500 hospital stays** for chronic obstructive pulmonary disease (COPD) among adults age 40 years and older. In addition, another **3.8 million hospital stays** included COPD as a secondary, or complicating, condition during an admission for some other problem. Thus, nearly 1 out of every 5 patients 40 years or older in U.S. hospitals has a diagnosis of COPD. *(Healthcare cost and utilization project 2011)*
Palliative care

- The principal indications for treatment with a nebuliser are the **palliation of breathlessness and cough**. Prescriptions for both should be reviewed within three days to check efficacy.
- Nebulised bronchodilators may relieve breathlessness due to concomitant reversible airflow obstruction but hand held inhalers should be assessed first.
- Lignocaine or bupivacaine may relieve dry persistent unproductive cough but not dyspnoea. Pretreatment with bronchodilators is advisable.
- Nebulised 0.9% sodium chloride as an **expectorant**, opioids for the relief of terminal **dyspnoea**, and corticosteroids for dyspnoea, in the presence of lung disease, have been used for palliation.
Inhalation where
Nebulisation in hospital;

In US in a survey 2007-2008 showed that bronchodilator therapy was administered solely as nebulized in 91% of hospitalized patients with an COPD exacerbation.

( Woods 2011 Southern Medical Association)
Nebulisation in the intensive care unit

• Indications:
  • Severe acute airflow obstruction
  • RSV infection in children
  • Bronchopulmonary dysplasia in children
  • Adult and infant respiratory distress syndrome
  • Pulmonary infection
  • Pulmonary hypertension
Nebulisation in the intensive care unit

• Nebulisers
  • Jet,Ultrasonic
  • Oral route or connected to ventilator

• pMDI
  • Spacer
  • Connected to ventilator
Nebulisation in primary care

• Emergency treatment of asthma and COPD
• Long term treatment of chronic airflow obstruction with bronchodilators
• Prophylactic treatment, as corticosteroids for asthma
• Antimicrobial treatment in cystic fibrosis
• Symptom relief in palliative care
Guidelines
Treatment with nebulisers

- The present British Standard (BS7711) for jet nebulisers indicates that they should provide an aerosol with a respirable fraction of at least 50% at their recommended driving gas flows.

- Any combination of compressor and nebuliser needs to be assessed for a particular drug solution and drug volume. For the commonly used bronchodilators, output data derived from 0.9% sodium chloride can be used as a general guide.

- For drugs other than bronchodilators there is a particular need only to use equipment known to provide a suitable output and for patients to have specific instructions. Such treatment is best supervised by hospital specialists.

- Nebulisation time for bronchodilators should be less than 10 minutes. Patients should know how long nebulization should take when their equipment is working correctly. For bronchodilators the use of a mask or mouthpiece should depend upon convenience and/or patient preference.
AAFP US Guidelines 2010

• Therapeutic Options

• SHORT-ACTING BRONCHODILATORS

• Inhaled short-acting bronchodilators include beta agonists (e.g., albuterol, levalbuterol [Xopenex]) and anti-cholinergics (e.g., ipratropium [Atrovent]). These agents improve dyspnea and exercise tolerance.6,9 The first step in treating a COPD exacerbation is increasing the dosage of albuterol delivered via metered dose inhaler or nebulizer.9 Levalbuterol is more expensive than albuterol but has similar benefits and adverse effects.16 If the patient is not already taking ipratropium, it can be added to the treatment regimen.5 Fixed-dose albuterol/ipratropium (Combivent) is available.
The National Institute for Health and Clinical Excellence (NICE) recommends that when using nebulisers in COPD the following should be considered:

• Hand-held devices are usually best, with a spacer if appropriate.
• Consider a nebuliser for people with distressing or disabling breathlessness despite maximum therapy with inhalers.
• Assess the individual and/or carer’s ability to use the nebuliser before prescribing and arrange appropriate support and maintenance of equipment.
• Allow the patient to choose either a facemask or mouthpiece where possible.
• Continue nebuliser treatment only if there is an improvement in symptoms, daily living activities, exercise capacity or lung function.
• Cognitive function and praxis are more important than age in determining the ability of an older patient to use hand-held inhalers or nebulisers.
• Patients experiencing difficulties using hand-held inhalers may also have difficulty using nebulisers.
• Nebulised therapy should not continue to be prescribed without assessing and confirming that one or more of the following occurs:
  • A reduction in symptoms.
  • An increase in the ability to undertake activities of daily living.
  • An increase in exercise capacity.
  • An improvement in lung function.
• Nebulised therapy should not be prescribed without an assessment of the patient’s and/or carer’s ability to use it.
• Patients should be offered a choice between a facemask and a mouthpiece to administer their nebulised therapy, unless the drug specifically requires a mouthpiece (for example, anticholinergic drugs).
• Both nebulisers and hand-held inhalers can be used to administer inhaled therapy during exacerbations of COPD.
• If a patient is hypercapnic or acidic the nebuliser should be driven by compressed air, not oxygen (to avoid worsening hypercapnia). If oxygen therapy is needed it should be administered simultaneously by nasal cannulae. The driving gas for nebulised therapy should always be specified in the prescription.
Nebulisers in drug development
Drug-formulation-nebulisation

• Nebulisers are often chosen as a delivery mechanism during biotech drug development.
• They are less likely to denature proteins and other large molecules and they avoid the cost associated with formulation for dry-powder inhalers.
• As proteins and peptides become increasingly common as inhaled drugs, the biotech industry faces the challenge of how to deliver these fragile biomolecules without damaging them.
• Controlled-dose nebulisers might reduce formulation costs and facilitate early-stage efficacy trials.

Melbourne Scientific
Device and formulation

• Although controlled-dose nebulisers are more expensive than jet nebulisers and may require the supervision of a clinician, they have the added advantage that the quantity of drug received by the patient can be accurately controlled and measured.

• For small-scale trials they offer considerable advantages, according urn Scientific.

• Nebulisers create a mist of medicine that can be inhaled passively, and the drug can be delivered as a solution or suspension, which increases the possibilities for formulation.

• Nebulisers allow formulation in solution and so overcome some of the challenges of stabilising the drug.

• However, fragile APIs can be denatured by traditional jet nebulisers.

• The drug is delivered as an aerosol created by a compressor blowing air through the solution or suspension at high speed.

• A controlled-dose nebuliser, in contrast, uses vibrating mesh technology, which is much gentler and so less likely to damage the drug.

Melbourne Scientific
Nebuliser selection

• Studies are generally performed on a range of nebuliser devices, which will include a standard jet nebuliser system (1) alongside portable ultrasonic (2) and vibrating mesh (3) devices which have the potential to provide more efficient nebulisation and smaller aerodynamic particle size leading to greater lung deposition.

• Studies will also be undertaken at a range concentrations starting with 1 mg/ml as standard. Further samples will be tested using the preferred nebuliser device at 1 in 10 and 1 in 100 dilutions to ensure that predictable aerosol output and particle size is achieved across the possible range of concentrations to be used in in-vivo studies.

(University of Bradford, service to industry)
DISEASE X POPULATION X FORMULATION X DEVICE X BUDGET X TIME
Future perspectives of nebulisation
Nebuliser trends

• Small volume nebulisers
  • Reduce administration time
  • Portable

• Systemic use (high doses)

• Complement to DPI/pMDI
Where to find more:
Nasal Administration is Not Dead, It Just Smells Funny

Stefan Ulvenlund

CR Competence AB
Outline

• Indications
• Nasal physiology
• Drug deposition in the nasal tract
• Formulations and devices
• Pros, cons and opportunities
Indications

• Local treatment
  – Common cold
  – Rhinitis

• Central nervous system
  – Migrain
  – Pain relief

• Systemic administration
  – Hormones
  – Vaccines
Primary Functions of the Nose

• Breathing…
• Air conditioning
  – Temperature and humidity
• Defence
  – Filtering out particulate contaminants
  – Removing airborne pathogens
• Sense of smell
• Acoustics (the nasal cavity acts as a resonance device)
This Translates as a Drug Delivery Opportunity!

- We are built in such a way that lung administrations is very difficult…
- …but stuff tends to stick in the nose, whether we like it or not.
Nasal Physiology – General Outline

- Folded mucosa → large effective area
- Direct connection with the throat

This part is good!  This part sucks!
Nasal Physiology – The Mucociliary System

- Ensures rapid clearance
- Residence half-time in the nose: <20 minutes (strongly dependent on health status!)
- Sensitive to chemicals (particularly surfactants, solvents and preservatives)
Nasal Physiology – The Vascular System

- Rich blood flow $\Rightarrow$ rapid and efficient uptake of drug substances
Nasal Physiology – The Olfactory System

- Centre for the sense of smell
- Surface: 200-400 mm²
- Receptors situated on cilia
- Has been suggested to provide a direct route from the nasal cavity to the brain (central nervous system, CNS)
Nasal Formulation Concepts

- Liquids
  - Sprays (aqueous or pMDI)
  - Nose drops (instillation)

- Solids
  - Dry powders

- (Gels)
Nasal Deposition of Particles and Droplets

- Deposition has to be in the ciliated zone
- Droplet/particle size ideally $ca \ 10 \text{–} 50 \ \mu m$
- Specific deposition at the olfactory centre is challenging
- Difficult to avoid partial deposition in the lungs (small particles/droplets pass the nasal cavity and travel down the pulmonary tract)
Nasal Administration of Particles and Droplets - *Devices*

- Nasal pumps are well accepted by most patients
- Generally high compliance…
- …although they are more difficult to use than normally thought
Deposition of Nasal Drops

- Requires complex and sometimes awkward manoeuvres
- Difficulties controlling the administered volume
- Fast clearance down the throat

http://www.patient.co.uk/health/how-to-use-nose-drops
Advantages of Nasal Administration

• Rich blood flow and large area ⇒ Efficient uptake and rapid effect of drugs
• No first pass metabolism
• Low enzymatic activity
• No or low risk of over-dosing (the volume that can be administered is very limited!)
• Allows for administration of biomolecules
• Many devices (e.g. spray pumps) are well tolerated and easy to use (i.e. excellent patient compliance)
• Direct route to CNS???
Disadvantages of Nasal Administration

- Small volumes (<100 µl per nostril in adults)
- Limited uptake of molecules larger than 1000 Da
  - Better than the GI route (cut-off ca 600 Da)
  - Possible to improve with enhancers
- Mucociliary transport gives short residence times
  - Mucoadhesive formulations may improve the situation
- Difficult to inhibit concomitant pulmonary deposition
- The nasal mucosa is sensitive!
How sensitive is the nasal mucosa?

“Nasal Tolerance”

- Administered volume: <100 µl per nostril
- pH: 4.0 – 6.5
- Surfactants: <20 mg/ml
- Ethanol: <1%
- Preservatives: often toxic for cilia!

*Water is the only solvent without compatibility issues!*
Where are the Opportunities?

• Novel formulation concepts with good IP protection
• Administration of biomolecules – primarily peptides and vaccines
“Novel” Formulation Concepts - Microemulsions

- Thermodynamically stable mixtures of "oil", surfactant and water.
- Higher drug : surfactant ratio than micelles
- Stable only in a narrow composition range
- Normally require at least five components
Administration of Biomolecules

• A number of vaccines and peptides have been successfully administered intranasally, but bioavailability remains low (<5%, often <1%)

• Carefully engineered “nano-based” delivery systems may prove extremely valuable
  – Prolonged retention time
  – Enhanced drug absorption
Acknowledgements

• (As so many times before) I thank Frank Zappa for the title of the talk (although in this particular case he was actually referring to jazz, rather than to nasal administration)
zenit design
vision into value

Industrial design
and
Medical Devices
ZENIT DESIGN

Founded in Malmö 1994
One of Sweden’s largest design offices
Located in Malmö and Gothenburg
A multidisciplinary team of 25+ people
Strong pharmaceutical expertise
Network of partners
Over 30 design awards
why industrial design?
We believe that smart design solutions are developed through a holistic approach and a well-proven design process.
collaboration
DESIGN SOLUTION

- User
- Aesthetics
- Cost
- Other
- Operations
- Mechanics
- Market
- Brand
- User
design thinking?
Design thinking?
Design thinking?
Design thinking?

Start: requirement specification
  -> efficiency

Start: idée / concept
  -> curiosity / openness
user centered design
getting under the skin of the user
Watch, Interview

Openness, not prejudice

Find questions

Wait with solutions

Different viewpoints
Passive watching and active dialogue. Why, why, why. Workarounds are a source for new ideation.
New insight from own experience
Workarounds are a source for new ideation.
People don’t do what they say they do.......
visual concensus
Target group, Urban creatives

- male / female
- 18 - 45 years
- on-the-go
- enterprising
- personal brand building
- brand aware
- low price sensitivity

QUALITY  SUSTAINABILITY  GADGET CURIOUS  DESIGN CONSCIOUS
Target group, Urban creatives

- Hi-fi
- Gadgets
- Design
- Sustainability

family life
Inspiration boards

Precision  Distinct Scandinavian HighTech Graphic

Simplicity  Modern Soft  Dropshaped Young
Industrial Design reviews are important
A number of small changes can kill the concept.......
Conclusion

Compliance: understanding the users needs and addressing these with intuitive solutions

Adherence: creating a positive user experience, an exterior design and functionality that users can connect to
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The future of inhalation

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pharm-analyt Labor GmbH
Organizing committee

Orest Lastow
Karin von Wachenfeldt
Charlott Brunmark
Malin Ahlstrom Svensson
Mårten Svensson
Towa Carlsson
Sture Carlbom
Thank you for attending and see you all next year
3rd Medical Valley Inhalation Symposium

15 October 2014
09.00–17.00
Medicon Village, Lund, Sweden

inhalationsymposium.com