New Product Planning Network Group

Planning for Drug-Device Value Creation

December 7, 2023

Steering Committee Members Leads:

Kuyler Doyle and Anne Ollivier

NPP Network is Celebrating its 3rd Anniversary!

Our Vision ***To be the preeminent global thought leader for New Product Planning***

Our Mission:

- To promote the awareness and impact of early commercial planning on our industry
- To create an open community of NPP professionals which enables networking, shared learnings and deep connections
- To build and elevate our skillset in an ever-changing biopharma industry
- To positively impact patient's lives through insights and guidance to the clinical strategy process

Thank you to all speakers and participants to this year NPP Network Forums

Feb-28 — **Value and Access for NPP Professionals**

Agathe Le Lay, Leora Schiff

Apr-12 — **Impact of the Inflation Reduction Act on Pipeline Development**

Sara Nazha, Pedro Salomao

Jun-14 — **NPP Structures and Models from Emerging Biotech to Large Pharma**

Kathleen Davenport, Marnie Hoolahan, David Luckenbach

Sep-6 — **New Product Planning: The Function's Evolution in Pharma**
Published on: September 8, 2023
Anne Ollivier, C. Kuyler Doyle

Jacob Berlin, Becca Levin, Nitin Choudhary

Digital Innovation (AI) and Advanced Analytics for NPP Professionals

Oct 25 — **How to Grow Patients Centricity in Pipeline Decisions?**

Julia Carpenter Conlin, Stefan Cano, Patrick Marquis

Dec-7 — **Planning Drug-Device Value Creation**

Alphons Fakler, Steven Badelt, Serkan Oray, Nuria Rodriguez Garcia

Events led by the NPP Network Steering Committee Members

Mike Conlon, Valay Desai, Kuyler Doyle, Cathy Garabedian, Joe Melvin, Anne Ollivier, Morris Paterson, Victoria Revilla Sanchez, Cory Bartlett, Tony Russell

Steering Committee Volunteer Opportunities

- **Marketing/Communications Lead (1 person)**
  - We are looking for a proactive person who drives the message out about this group and think about the best ways to engage in the short and long term in order to achieve our Thought Leadership Vision
  - This tech savvy peer leverages/ optimizes existing platforms (website/ linked-In) and recommends other levels to get the NPP Network seen and heard by the broad biotech/pharma community
- **Forum Planning Lead (1-2 People)**
  - We are looking for at least one person to lead this effort. The lead will need strong project management skills and willing to get to the front of the NPP community via its regular Forums
  - This role will work with other SC members to coordinate a few events/ year by engaging with speakers, driving the content readiness, preparing surveys and ensuring a successful event
  - This role is working closely with the Communication Lead on the event specific messages creation for dissemination

Planning for Drug-Device Value Creation Today's Panelists

Steven Badelt, PhD
Founder and CEO at Suttons Creek

Planning for Drug-Device Value Creation

Nuria Rodriguez Garcia
Partner, Global Market Access & Pricing at Alira Health

Alphons Fakler
Dir Human Factors Engineering at Novartis

Serkan Oray
VP, Devices, Packaging, & Wearable Technologies at UCB

Combination Product Development

COMMERCIAL ROLES + RESPONSIBILITIES

DECEMBER 7, 2023
Biopharm New Product Planning Network

SPEAKER: STEVEN W. BADELT, PhD

STEVE BADELT, PhD | Founder & CEO
SUTTONS CREEK, INC.

Steve is a seasoned expert in combination products, engineering management, systems engineering, and business development. He has over 30 years of experience in the design and launch of combination products and medical devices. Steve founded consulting firm Suttons Creek, Inc., which has served as the device team for pharma on over 120 programs. In his spare time, Steve advises several startups, speaks nationally about combination products and connectivity, has served as a Graduate Professor at Loyola Marymount University, and operates his family vineyard in Paso Robles, CA.

Academic & Professional Qualifications:

Bachelor of Science, Electrical and Biomedical Engineering, Carnegie Mellon University
Master of Science, Neuroengineering, UCLA
PhD, Biomedical Engineering, UCLA

AGENDA

01 **What are combination products?**
Definition, examples, and what makes them unique

02 **Combination Product Development**
Complexities, timelines, and dependencies

03 **Commercial Team's Role**
Inputs, responsibilities, and impact on product success

04 **Takeaways**
Common missteps and best practices

SUTTONS CREEK: THE DEVICE TEAM FOR PHARMA

Supporting Combination Products for more than a decade

2012 founded

Team recruited from throughout the Combination Product industry:
Pharma, Device OEM's and FDA Reviewers

TODAY

TEAM: 70+ (US + Europe)

COMBINED CP EXPERIENCE: 650+ yrs

PROJECTS:

- 120+ drug and biologic delivery devices
- 70+ big and small pharma clients led to success
- Servicing approx. 50 projects at any given time

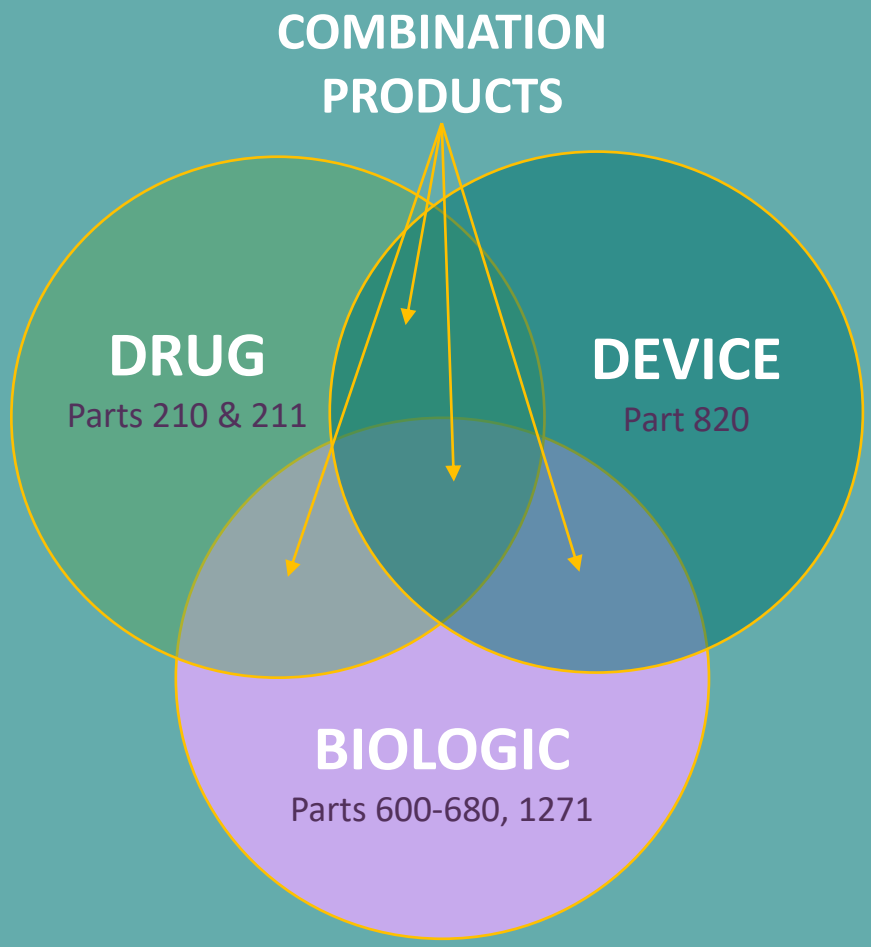
WHAT ARE COMBINATION PRODUCTS?

Combination Product

A product comprised of two or more regulated components, physically, chemically, or otherwise combined or mixed and produced (21 CFR 3.2 (e)).

Each individual product in this combination is a constituent part – a device constituent part, drug constituent part, etc.

Combination Products can be cross-labeled (constituent parts sold separately), co-packaged (constituent parts packaged and sold together), or single-entity (chemically or physically combined constituent parts).



COMBINATION PRODUCT EXAMPLES

1. Single-Entity Products

- Prefilled syringes
- Prefilled auto-injectors
- Metered-dose inhalers
- On-Body Delivery Systems
- Dry powder inhalers
- Nasal-spray
- Transdermal patch systems
- Prefilled iontophoresis system Microneedle "patch"
- Drug pills embedded with sensors
- Contact lens coated with a drug
- Drug-eluting stents
- Drug-eluting leads
- Condoms with spermicide
- Dental floss with fluoride
- Antimicrobial coated catheters/sutures
- Bone cements with antibiotics
- Live cells seeded on/in a device scaffold
- Extracorporeal column with column-bound protein

2. Co-Packaged Products

- Empty syringes packaged with a drug product
- Empty injection systems packaged with a drug product
- Transfer sets
- Lyophilized drug product vials packaged with reconstitution components.
- Surgical kits containing both a drug and a device to be used with it

3. Separate Products With Cross-Labeling

- Light-activated drugs/biological products labeled for use with a specific light source device

THE COMBINATION PRODUCT COMPETITIVE ADVANTAGE

Offering a drug via a combination product changes the game and requires new knowledge and strategies.

- The interaction between a patient and a device is often more intimate and involved than with just the drug.
- Human interaction with the therapeutic functions is the reason for the regulations that began to emerge in 2012.
- Human interaction is what allows us to provide a unique experience and competitive advantage.

The Pharma industry is relatively immature in terms of medical devices. This usually means that device teams and their commercial counterparts are all working within an organization that "doesn't get it." These constraints can affect your ability to provide the optimum patient experience.

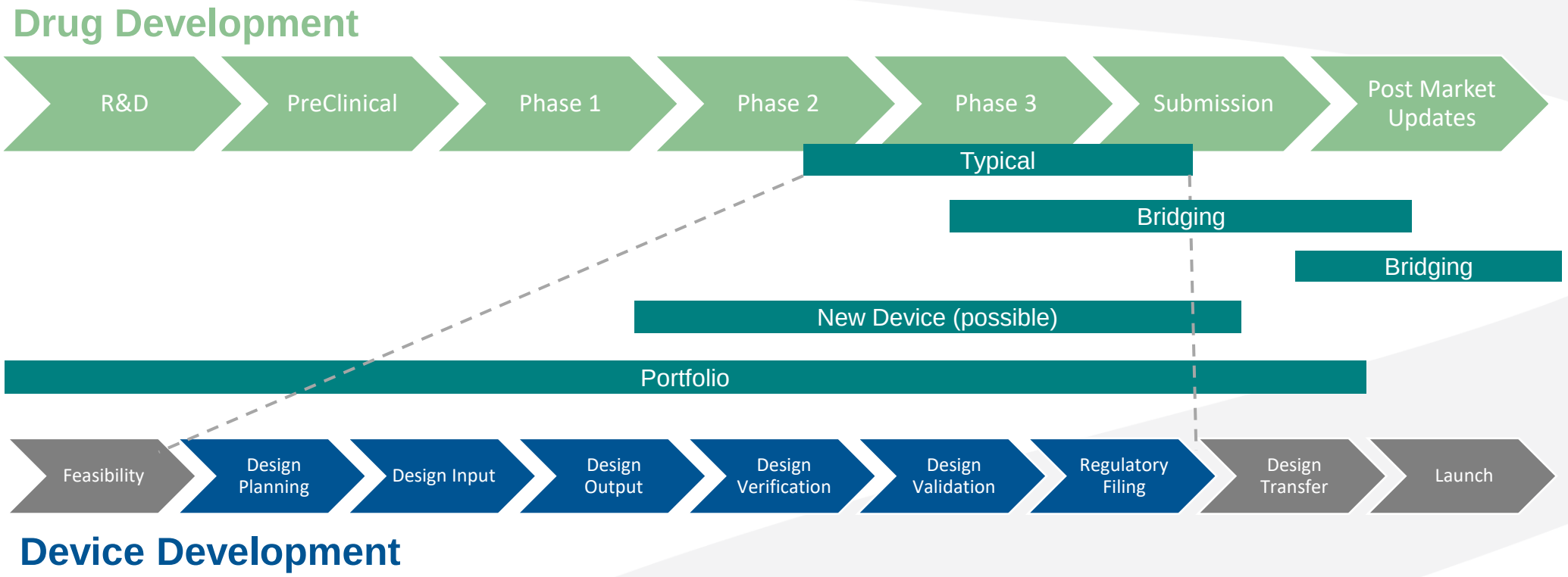
A MORE COMPLEX REGULATORY PROCESS

DRUG + DEVICE = COMBINATION PRODUCT

DRUG DEVELOPMENT QUALITY PROCESS + DEVICE DEVELOPMENT QUALITY PROCESS = COMBINATION PRODUCT DEVELOPMENT PROCESS

A MORE COMPLEX TIMELINE

Comparison
DP Asset & CP Timelines



A MORE COMPLEX TEAM STRUCTURE

Device side

Accustomed to Device/ Combination Product Development

Development/Engineering

Device Quality

Device Regulatory

Human Factors

Device Partner(s)

Drug Side

Newer to Device/ Combination Product Development

Drug Product Formulation

Supply Chain

Manufacturing

Quality Control

Regulatory CMC

Program Management

Other Functional Areas

Not commonly engaged in Device/ Combination Product Development

Clinical Development

Commercial/Marketing

Medical Affairs

Regulatory (Clinical)

Business Development

Drug Safety/Pharmacovigilance

UNDERSTANDING WHAT IMPACTS CP DEVELOPMENT TIMELINES

Design Choices

- The complexity of the drug delivery device and its use define the number of activities
- The complexity increases the number of dependencies and testing
- Function performance testing is carried out, including real-time aging studies
- Each step in preparing a device for injection is required to be tested
- **Summary:** a prefilled syringe has less steps than an on-body injector and, therefore, would have a slightly shorter timeline. Aging studies would still be the same.

Formulation Choices

- Early decision on the formulation, concentration, viscosity, and volume impact the design choices that are available to you

Design Changes

- Changes later in the process increase the number of tests, which mean an increase in time and money

IMPACT SCENARIO: COLOR CHANGE

Design Changes

- You have completed the design of the product and it is past the stage of design freeze. It has gone through the internal governance process. Certain design components have been submitted, including size, color, volume fill.
- Commercial continued to do market research and has concluded that a change in color is warranted on the outside packaging (box) and on the device.

What are the implications of such a change?

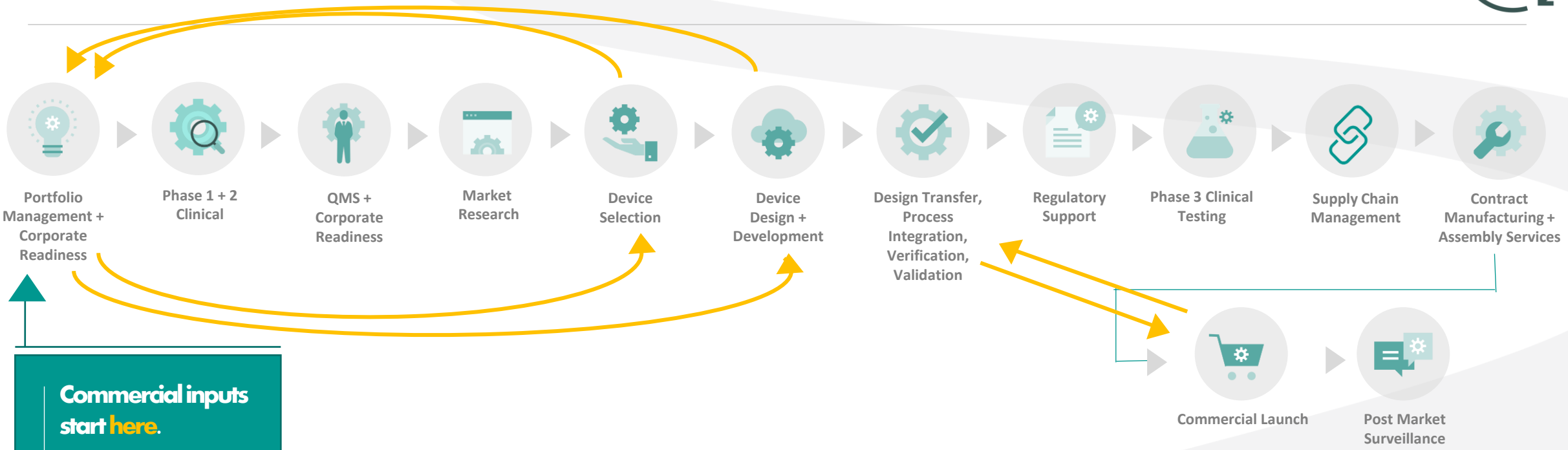
Design Change
Repeat Testing Required
Timeline Delay and Proposed New Commercialization Date
Impact on Project Cost – Development Budget
Impact on Team Resources – Number and Availability

Who are the final decision maker(s)?

Individual
Committee
Leadership

PROVIDE INPUTS AT THE RIGHT TIME

Combination product development is not a linear process.



Commercial inputs start here.

Though Device Selection occurs steps down the line, cross-functional device alignment should start during strategy development and continue through post market surveillance.

COMMERCIAL TEAMS PROVIDE ROLES + RESPONSIBILITIES

Portfolio Management	Design & Development Planning	Device Design and Development	Design Verification & Validation	Process Validation & Scale Up	Launch & Postmarket Activities
Build Strategic Case for SC device- Forecast, IV vs SC	Market Segmentation	Supply Chain Preparation	Launch Strategy and all activities	Launch Strategy and all activities	Patient training and support
Commercial Viability	Physician strategy	Cold chain considerations	Claims and impact on strategic messaging	Specialty Pharmacy strategies	Patient Adherence Support
Program Goals- what does success look like	Payor strategy	Size of product	Understand safety and efficacy tradeoffs and impact on patient and physician	Payor Agreements,	Internal training and education
Product Presentation to Market	Understand revenue implications for physicians in the US	Patient- supply chain	Forecast demand for full scale manufacturing	Service Level Agreements	Specialty Pharmacy support and negotiations
Market research- what the patient wants and needs	New Patients and Conversion strategy	Patient willingness to convert and use	Specialty Pharmacy strategies	Physician Feedback, Patient Needs	Launch and post market analysis
What frequency is acceptable	Device Selection, Marketing Plan, Payors, Communication	Market research with current patients	Complaints and returns process design	Ease of Use of the product by the patient	Product Improvement and changes
Patient reported Outcomes to include in clinical studies to support the patient needs and market access	Site of care	Forecasting demand	Global Value Dossier	Global Value Dossier	Competitive threats
Claim- design the trial to support the ideal claim	Pricing= similar to IV?	Device selection- is performance aligned with minimum requirements	Patient support hotline, web design	Pricing and Contracting	Home Care Services
Drive the design of the product from a consumer perspective	Payor- rebates and discounts	Educations	Key Performance Indicators	Patient Support Hotline	
Minimum design requirements	Patient Out of Pocket costs	Internal- consumer product so consider communication and marketing strategies		Training	
Thought Leaders and current prescribers' input and education	Demand Planning	External: Thought Leaders, Patient Organizations			
Understand Payor perspectives- impact of change from medical benefit to pharmacy benefit	Quality performance requirements (reflecting patient needs)	Input into IFU – patient friendly language			
	Drivers and barriers to access	Distribution			
	Total cost of care benefits				
	Scenario Planning				
	Device Options				

Infra-structure Strategy

Formulation

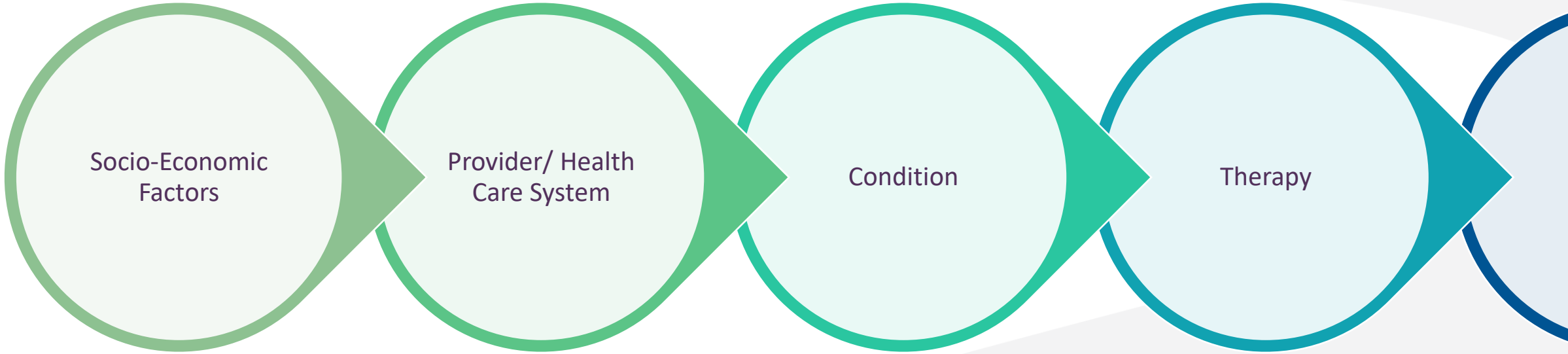
Product Development

Manufacturing

Commercialization

THE COMMERCIAL TEAM IMPACTS PATIENT ADOPTION AND ADHERENCE

Factors in patient adherence:



- **Ability to pay**
- Family and social support
- Access to healthcare facilities

"64% OF AMERICANS AVOID/DELAY TREATMENT DUE TO COST"

- **Provider/patient relationship**
- **Coverage/restrictive formulary**
- **High copayments**
- Long wait times
- **Continuity of care**
- **Support adherence and interventions**

- Severity of symptoms
- Lack of symptoms

- Complexity of medication regimen
- **Ease of use**
- **Mastery required on techniques of injection**

- **Ability t consiste**
- Visual/h impairm
- dexterit

https://www.carepayment.com/new-carepayment-research-shows-americans-cant-afford-medical-bills/

COMMON MISSTEPS BY COMMERCIAL TEAMS

STRATEGY	Insufficient VOC Market Research when identifying and establishing patient-centric requirements
	Assuming what worked in the past is the best commercialization approach for the current product/market
	Ignoring regional markets and taking a global approach
	Believing technical features and clinical efficiency alone are going to sell the product
	Not conducting a limited, controlled launch of a new/modified device
RESOURCING	Not expending adequate resources to identify and create customer solution and market awareness
	Under-resourcing digital marketing vs. general marketing creation activities
TRAINING	Not understanding company QMS, device complaint reporting procedure, complaint outcome and User feedback process
	Insufficient User training activities: HCP, Staff, Patient, Pharmacy
POSTMARKET	Inadequate feedback process from the field directly to senior management (i.e., field issues, competitive intelligence, new products, market trends)

WHAT CAN WE LEARN FROM THE WEIGHT LOSS MARKET?

TRULICITY PROPRIETARY INJECTOR

Clinical superiority may not stave off market share erosion in a saturated market.

- Lilly's Trulicity with a proprietary injector **won market share** even though Novo Nordisk's Ozempic had superior clinical efficacy.
- Research into Lilly's user experience advantages may inform future injector requirements
- Future product iterations by competition can create market share-capturing improvements

WHAT CAN WE LEARN FROM THE DIABETES MARKET?

OMNIPOD INSULIN PATCH PUMP

- Trains the patient on how to use the Pod
  - Pod trainers
  - Mobile App
  - Demo kit
  - Patients fills the pod with insulin
- Insulet makes the Omnipod®
  - Virtually ‘pain free’
  - Enables continuous administration over time
  - One pod versus injections of 4.5 times per day
  - Waterproof
  - Added mobile platform
- Customizable for a variety of injectable drugs
  - Neulasta® Onpro®
  - Working with additional partnerships
- Widespread commercial coverage

Insulet investor presentation 2019
http://investor.insulet.com/static-files/e8f5d402-1355-43ae-9501-c121e8d698d3

WHAT CAN WE LEARN FROM THE DIABETES MARKET?

MEDTRONIC INSULIN PUMP

SERVICES YOU NEED, WHEN YOU NEED THEM.

Training & Education

Training & Education

We offer personal training, tailored to help you get the most from your MiniMed™ 670G system. Count on expert support from diabetes educators, therapy consultants and clinical specialists.

24-Hour Technical Support

24-Hour Technical Support

Our 24-Hour Technical Support team is here for you around the clock to answer all your questions. Our unmatched service is the #1 reason customers stay with us.

StartRight℠ Program

StartRight℠ Program

Our free coaching program helps you get started. Your StartRight℠ representative prepares you for upcoming product training, setting diabetes therapy goals and tracking progress.

Global Assistance

Global Assistance

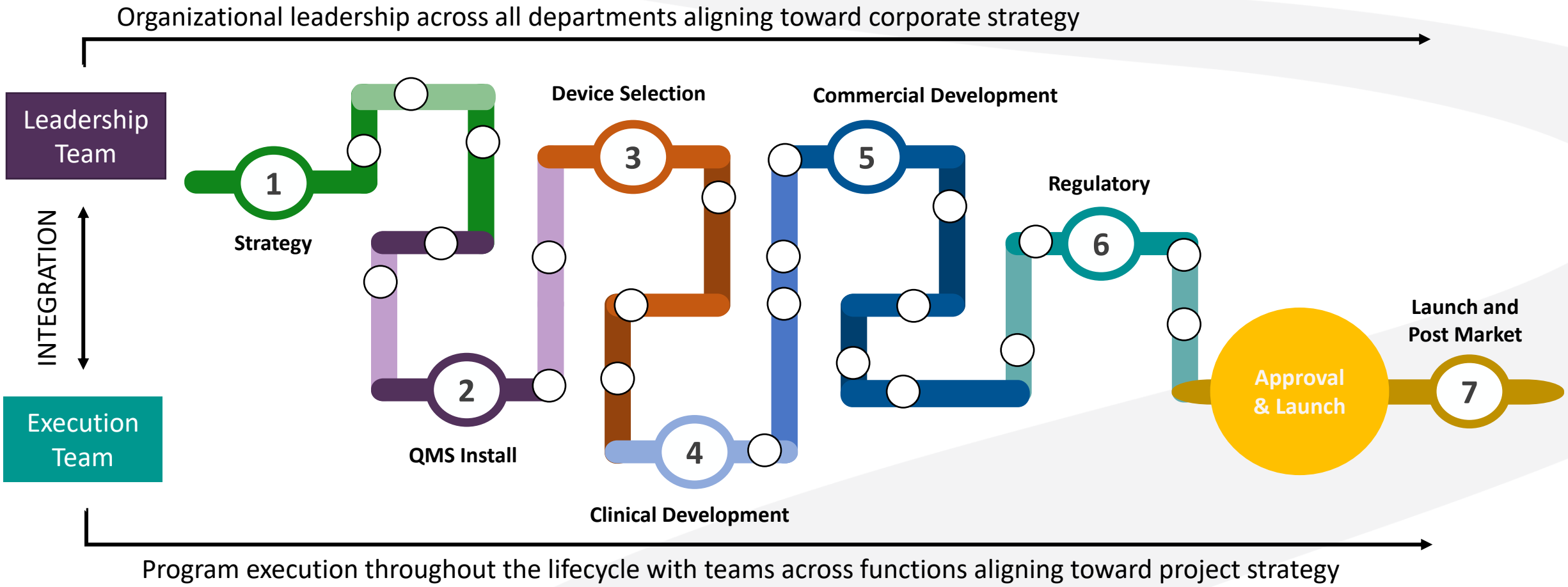
When you travel with your MiniMed 670G system, get access to our global support network. We've got you covered in more than 100 countries worldwide.

YOUR FIRST NEXT STEPS

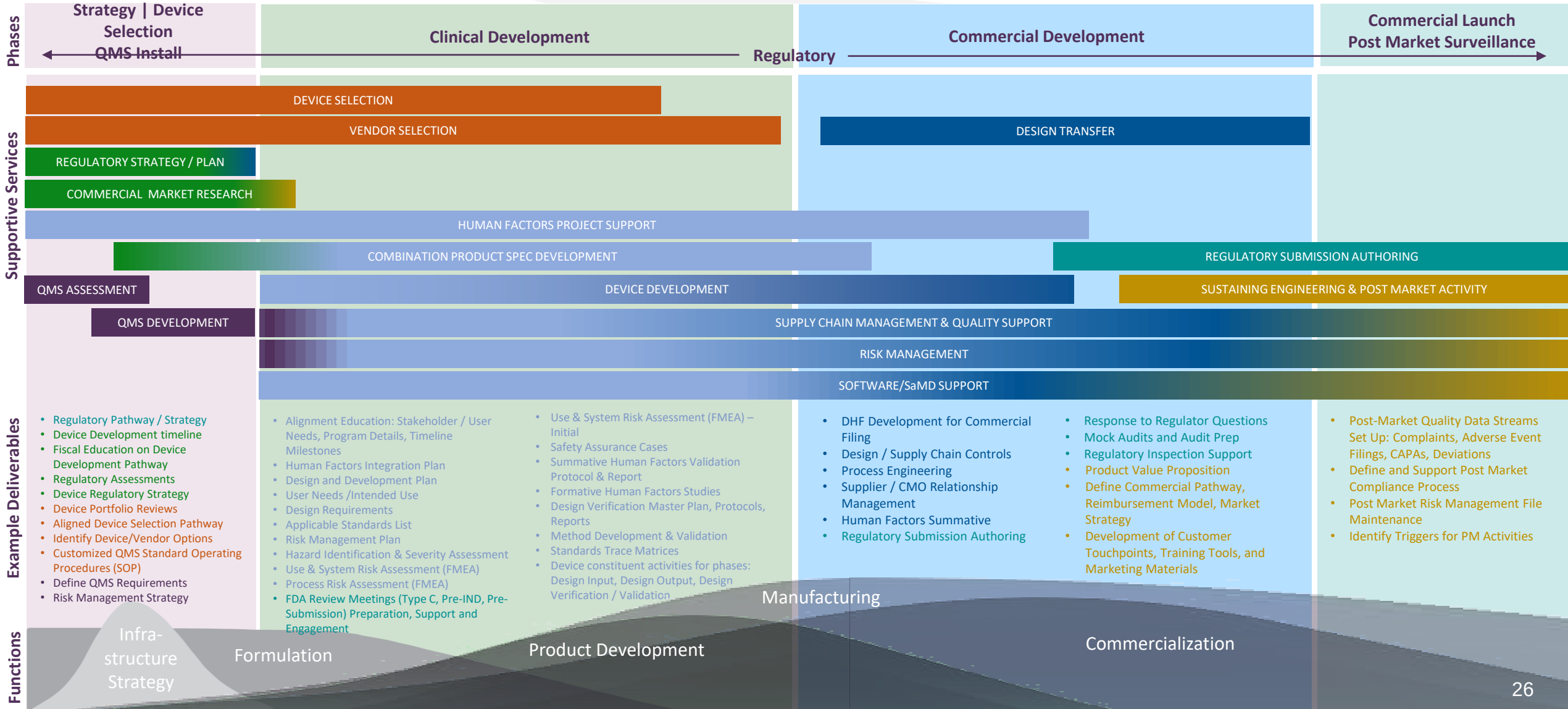
1. Begin cross-functional alignment by reaching out to two key colleagues:
   - Program Manager
   - Regulatory Manager
2. Build your knowledge-base through targeted trainings that will improve your processes and competitive advantage:

- Combination Products 101
- CP: Unique Processes, Challenges & Opportunities for Commercial Teams
- Cross-Divisional Stakeholder Goals, Roles & Responsibilities
- CP Market Research Considerations
- Timelines & Critical Decision Points
- Patient/User Needs Identification & Impact on Decision-Making
- Commercial Decisions: Factoring in Human Factors
- The Commercial Package
- Instructions for Use (IFU)
- Complaint Handling
- Effective Promotional Materials
- Patient & HCP Training
- Patient Support Hubs
- Reimbursement Considerations

KEY MILESTONES FOR CP DEVELOPMENT



A MORE COMPLEX DEVELOPMENT PROCESS



Patient centricity in device development

Alphons Fakler

Dec 7th 2023

Alphons Fakler

Director Human Factors Engineering, Novartis Pharma AG

Professional with 20+ years of experience developing analytical and medical devices for pharmaceutical and bio-tech applications

Education

State Examination Pharmaceutical Sciences,
LMU Munich

Post Graduate Degree Applied Statistics,
Swiss Federal Institute Zurich

Previous Roles

Director External Technical Development and Partnering, Novartis Pharma AG

Head Medical Device Risk Management, Novartis Pharma AG

Head of Product Design and Process Development, Schott AG

Expertise

Parenteral packaging, medical devices (ISO 13485), medical device risk management (ISO 14971), software as medical device (SaMD) project management, external partner management, quality management, qualification and validation of manufacturing equipment

The role of Human Factor Engineering in development of drug delivery devices

HFE is ...

applying the understanding of human interactions

to design user-interfaces in order

to optimize human well-being and overall system performance

It's all about ...

patients/users and their needs

tasks and

environments

It involves the users ...

throughout design and development and

drives patient/user centric design

It ensures ...

usability,

safety and

access to market

Various user interfaces are important ...

Device itself

Device label

Packaging and labeling

Instructions for use

Apps and websites

Educational material

User interface elements can be ...

Angle and orientation

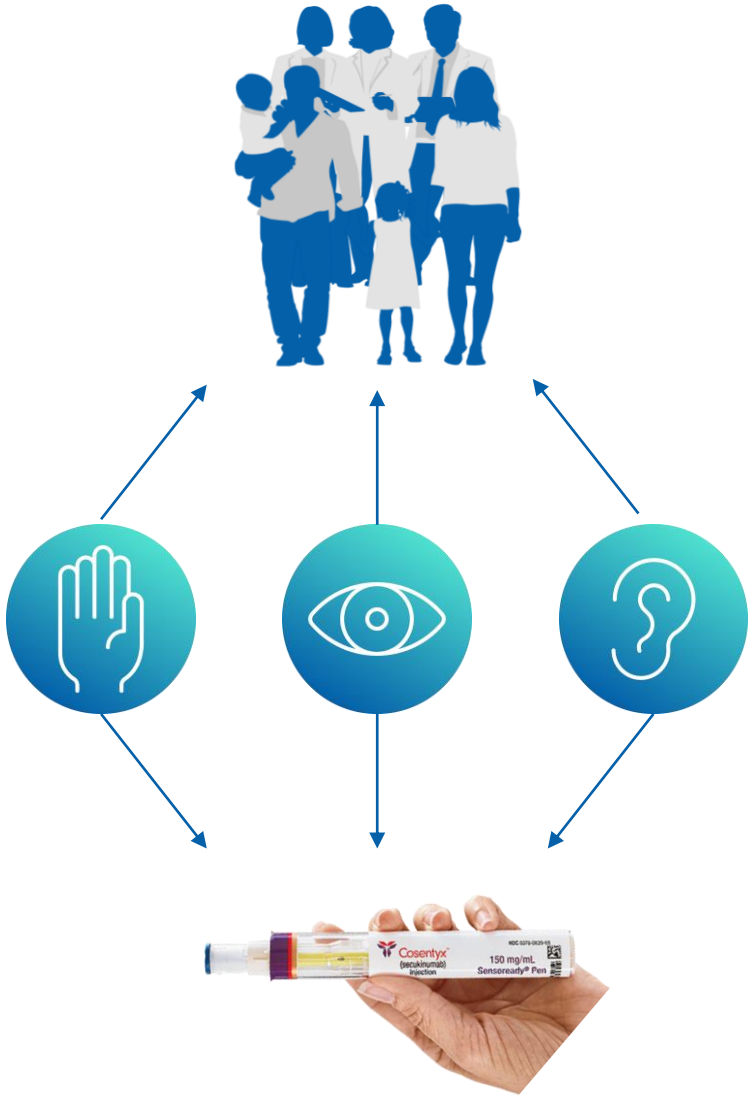
Button color, shape and size

Hand size and grip posture

Device size and shape

Visual and auditive feedback

Force and torque



How can HFE support market and user research for devices

Non-investigational user/customer/patient preference study

Investigate the relative importance of attributes driving preference for different device solutions and differentiation factors

- Preliminary insights feedback from patient advisors and opinion leaders
- Qualitative studies by collecting feedback on barriers, current and future needs, preferences and tradeoffs, key value drivers through patient preference studies
- Quantitative studies by collecting feedback on future technology platforms and use case scenarios including feedback from health authorities

Formative user studies

conducted during the early stages of the development process

intended to gather feedback and evaluate the usability, functionality, and safety of the device concepts/prototypes

helps to guide the design and development process by providing valuable insights and user feedback

help identify design flaws, usability problems, and potential risks associated with the device

User study examples: Autoinjector

Aspects investigated during patient preference study or market analysis

Single use or disposable device

Injection volume

Storage conditions

Ecofriendly design

Device activation

Audio-visual feedback

Shape and size

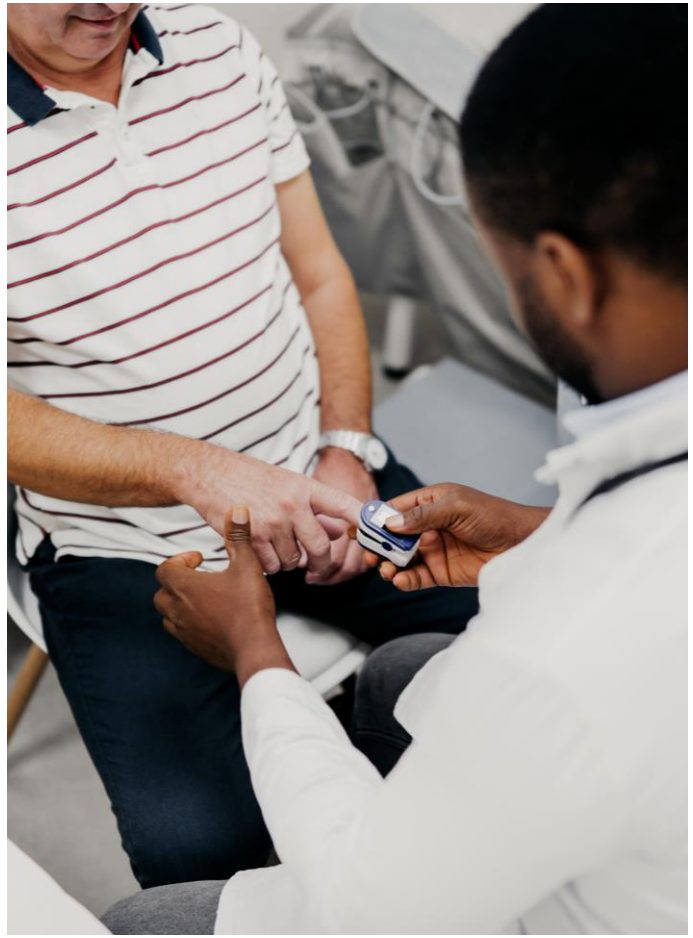
Questions investigated during formative study

Does the user/patient know where to inject the drug?

Is the user/patient able to prepare the device for injection (e.g. remove the cap)?

Perform the injection correctly (orientation, button press, detect end of injection)

Dispose the device correctly?



Device platform strategy and consequences for NPP

Why platforming?

power of scale (supply chain, manufacturing, standardization, building on experience)

What's the price?

higher upfront investment

increased complexity

technical compromises

alignment during life cycle management

What needs to be considered?

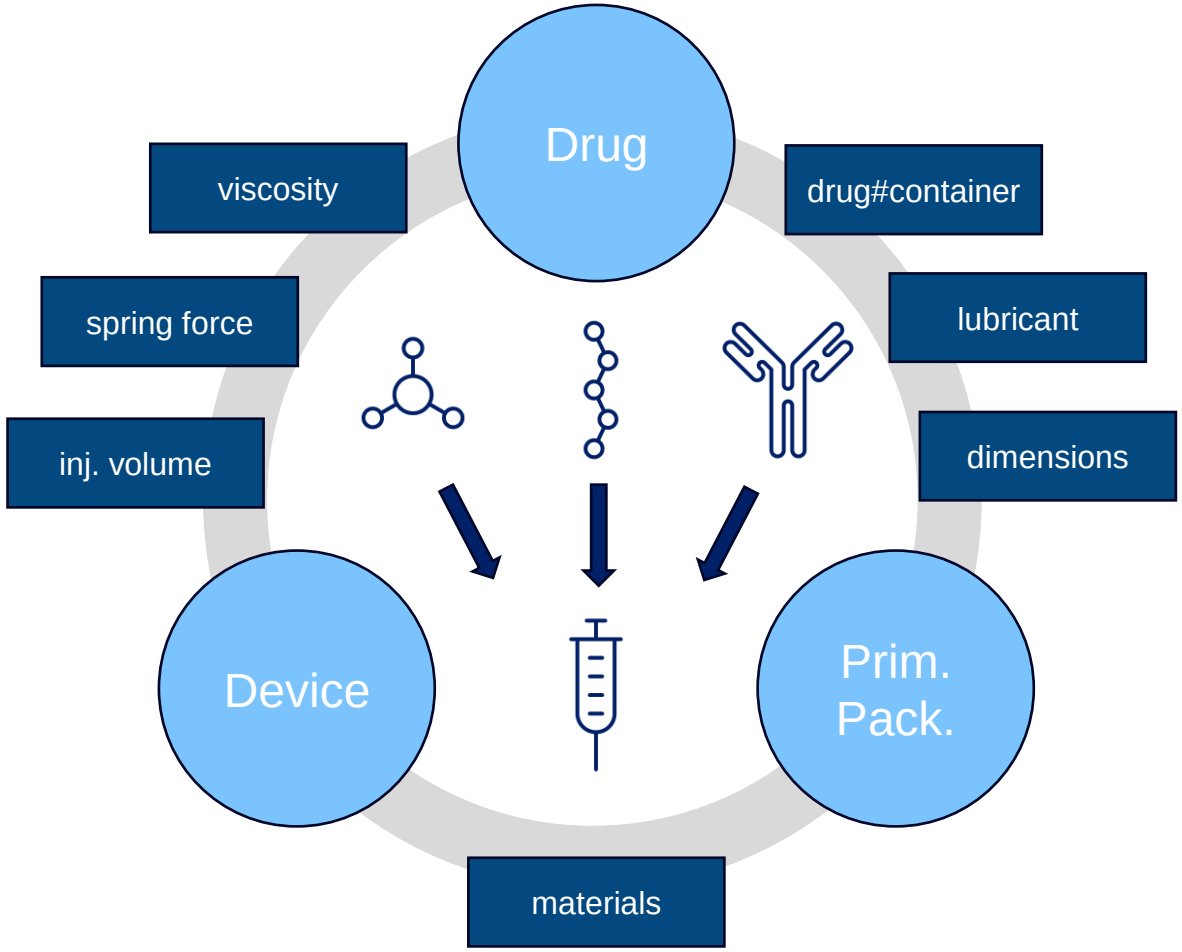
communalities/synergies

balance between complexity and flexibility

commercial forecast

timelines

supply chain



QUESTIONS TO ALPHONS FAKLER

Device considerations for New Product Planning

Serkan Oray, PhD

Serkan is employed by UCB. This presentation represents his professional perspective which may not represent the perspective of UCB.

No Artificial Intelligence was used (or harmed) in the preparation of this presentation.

Serkan Oray

VP, Head of Devices, Packaging & Wearable Technologies

Education
BS, Biomedical Engineering, USC, Los Angeles, CA, US
MS, Biomedical Engineering, USC, Los Angeles, CA, US
PhD, Neuroscience, MIT, Cambridge, US

Previous Professional Experience
Vice President, Head of Devices
UCB New Journey Board
Director, New Product Planning
Associate Director, Medical Support & Systems
Medical Science Liaison CNS

Agenda

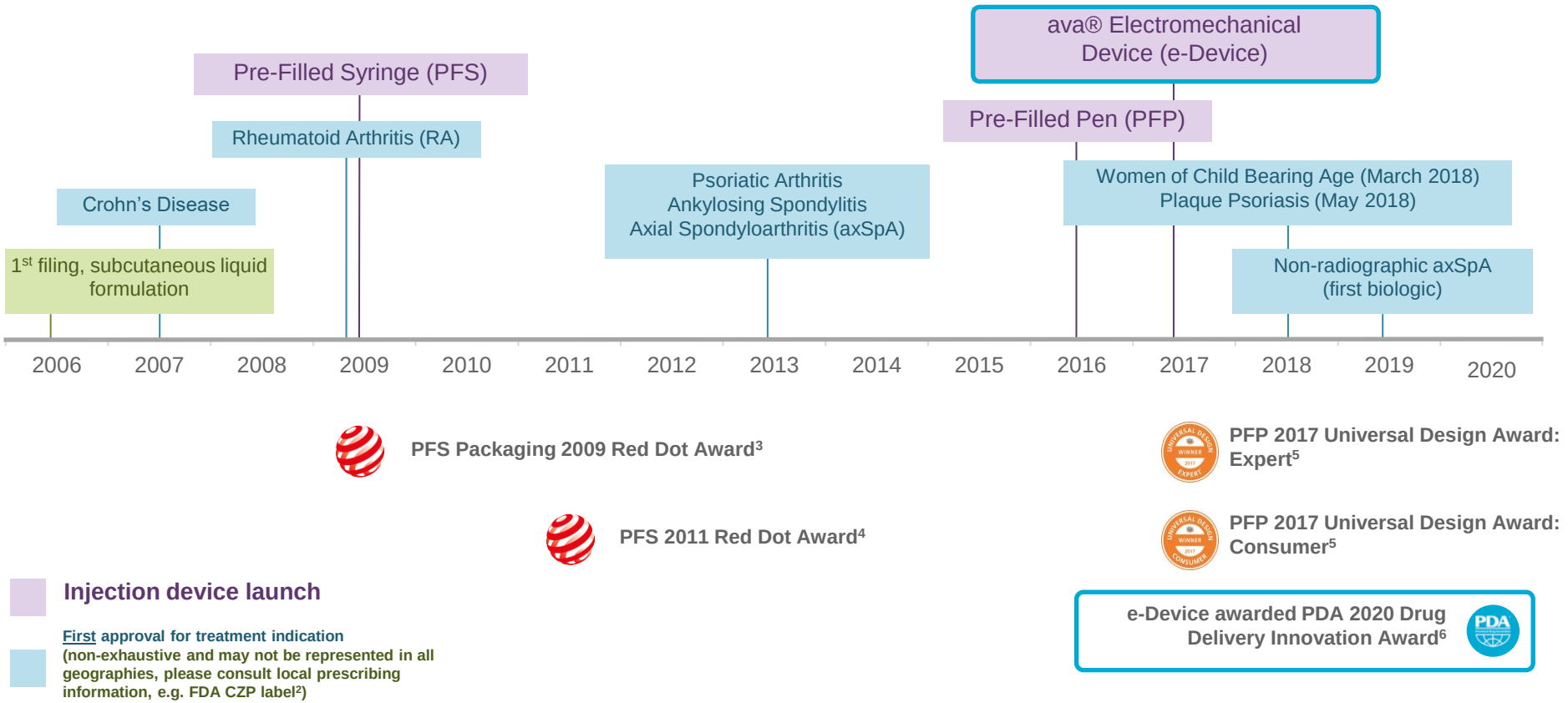
- Case study for a medicinal product – what is the case for differentiation?
- Market landscape for injection devices
- Competition in the land of biosimilars

Case study

Slides adapted from 2 conference presentations:

- Oray S (2021) A First Experience with the ava® Electromechanical Injector and its Approach to Connected Health. 2021 Pharmapack Europe, September 27 – October 15, virtual.
- Oray S, Harrison D (2020). Product Innovation Through a Portfolio of Patient-Centric Self-Injection Devices for Certolizumab Pegol. 2020 PDA Universe of Pre-Filled Syringes and Injection Devices, October 5-8, 2020, virtual.

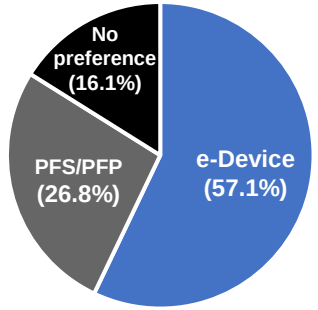
A brief history of certolizumab pegol



1. Summary of Product Characteristics. EMC 2021. Available Online: https://www.medicines.org.uk/emc/product/4450/smpc#gref; 2. https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/125160s283lbl.pdf; 3. https://www.ucb.com/stories-media/Press-Releases/article/UCB-and-its-design-partners-OXO-and-Smart-Design-win-2009-Red-Dot-Communication-Design; 4. https://www.ucb.com/stories-media/Press-Releases/article/UCB-and-its-Design-Partners-OXO-Win-Coveted-Design-Award-for-Cimzia-Syringe-and-Packaging; 5. https://www.ucb.com/_up/ucb_com_presscenter/cision-assets/presscenter-asset-9243-12303-1.pdf; 6. https://www.pda.org/footer/press-resources/press-releases/press-release-detail/pda-announces-2020-drug-delivery-innovation-award-winners. axSpA: axial spondyloarthritis; CZP: certolizumab pegol; e-Device: electromechanical device; FDA: Food and Drug Administration; PDA: Parental Drug Association; PFP: pre-filled pen; PFS: pre-filled syringe; RA: rheumatoid arthritis.

A portfolio of self-injection devices is required to address the preferences of patients with chronic inflammatory diseases[1]

	CZP Pre-Filled Syringe (PFS)[2]	CZP Pre-Filled Pen (PFP)[3]	CZP e-Device[4]
Preference Drivers	 • Complete injection speed control • Visible needle	 • Fixed injection speed • Hidden needle • Ease of delivery	 • Adjustable injection speed and pausing • Hidden needle • Ease of delivery ava Connect®
Populations	Current PFS users keeping their routine Patients who wish to be in control and who are not anxious about seeing the needle	Current PFP users keeping their routine Those who want to perform the injection quickly and simply Patients who do not want to see the needle	Patients who wish to <u>combine</u> ease of self-injection with increased self-injection control Patients who want injection tracking features For compatibility with CimplyMe®, a companion smartphone app[5]



Different patients have different device preferences, necessitating a portfolio of device options[5]

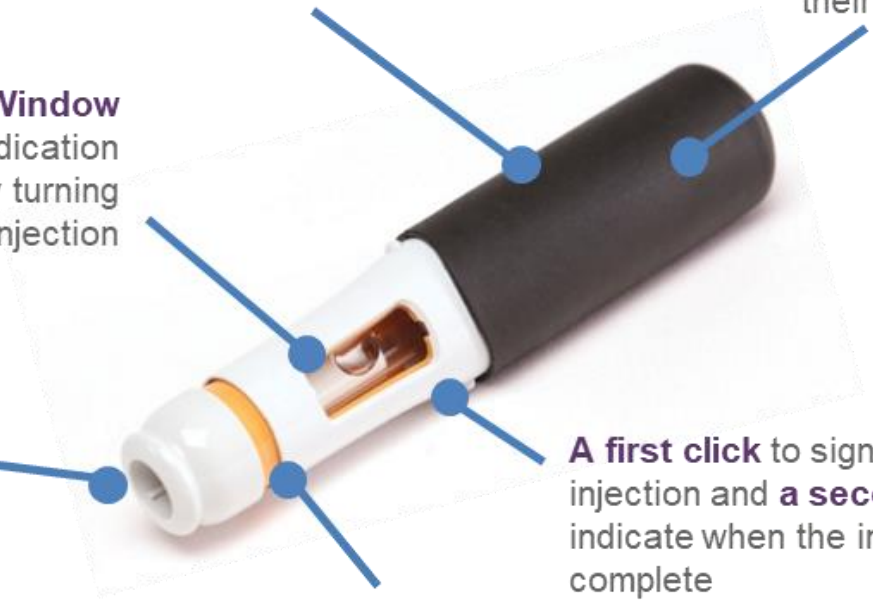
1. van den Bemt BJF et al. Drug Deliv 2019;26(1):384–392; 2. Summary of Product Characteristics. EMC 2021. Available Online: https://www.medicines.org.uk/emc/product/4450/smpc;
3. Summary of Product Characteristics. EMC 2021. Available Online: https://www.medicines.org.uk/emc/medicine/32367#gref; 4. Summary of Product Characteristics. EMC 2021. Available Online: https://www.medicines.org.uk/emc/product/10960/smpc#gref; 5. Domańska B et al. JMIR Form Res 2020;4(7):e17373. 5. Domańska B. Expert Opin Drug Deliv 2017;14:15–22. CZP: certolizumab pegol; e-Device: electromechanical device; PFP: pre-filled pen; PFS: pre-filled syringe.

Certolizumab pegol ergonomic pre-filled pen

Wide, Latex-free, Non-slip Grip
Assists patients with dexterity challenges

Button-free Injection
Patients can use force from their whole arm

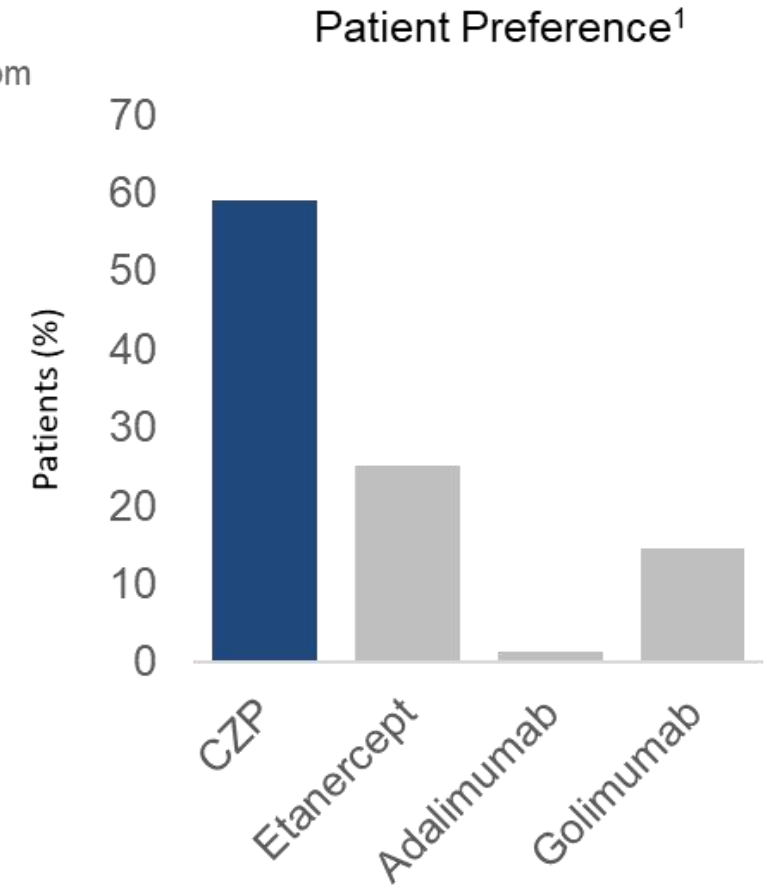
Viewing Window
Shows patients that the medication is being administered, by turning orange at the end of the injection



Retractable Needle
After injection remains locked and hidden inside the device

A first click to signal the start of the injection and **a second click** to indicate when the injection is complete

Orange Band
Indicates device is ready to use and compresses and disappears upon injection initiation



1. Pouls B et al. Expert Opin Drug Deliv. 2020;17(5):705–711

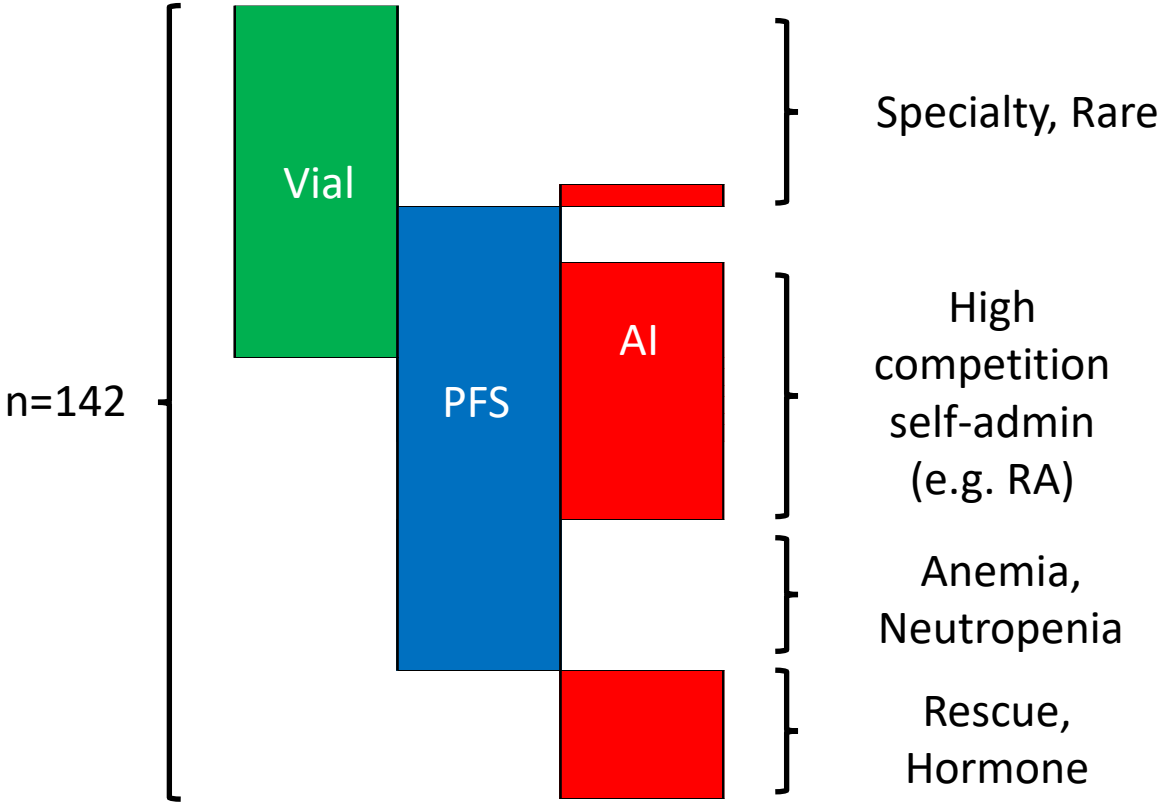
Considerations

- For a drug-device combination product, the true differentiation arises from the medicine.
- Devices can bring extra differentiation by generating baseline expectations and a sense of “negative differentiation”. (e.g. patients in a self-administration market that switch from a product with an auto-injector may not agree to start a product that only has a prefilled syringe).
- So far, there is theoretical belief in the value of connected devices but only modest data supporting their market value.
- Generally, for drug-device combinations, development costs and timelines for delivery devices should be considered in the total program costs. These development programs can be risk-adjusted but one should consider “probability of delay or extra cost (PODEC?) rather than a black and white probability of success. A device can be endlessly engineered while a molecule simply dies with a tox finding or lack of efficacy.

Marketed subcutaneous and injectable products

No specific referencing of the data in this section other than FDA and EMA public databases, last updated Oct 2023.

Parenteral launches 1987-2023

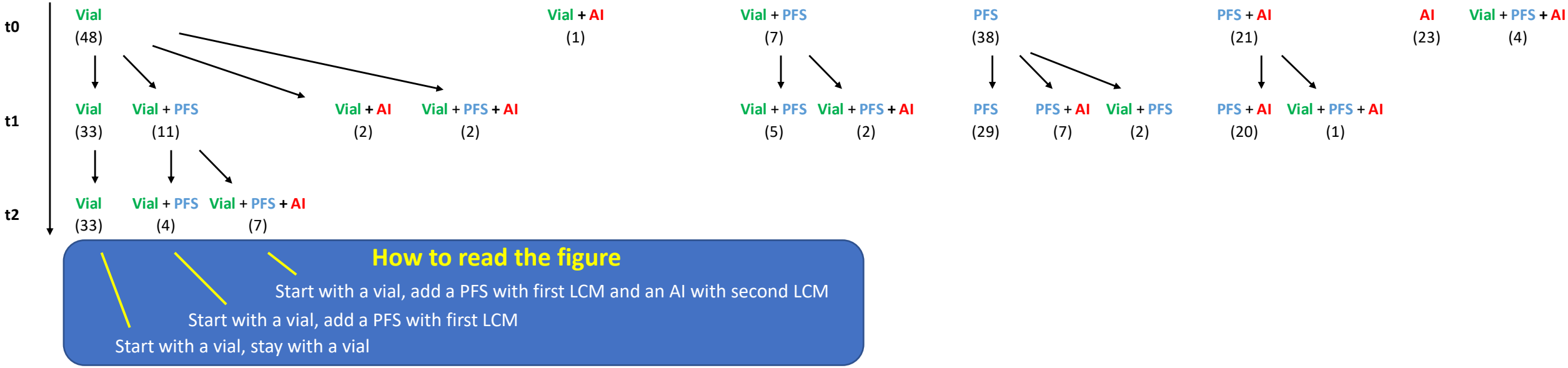


Data Set: Parenteral launches, 1987-2023, including biosimilars but excluding diabetes (often pens), oncology (often IV), opthalmic (often drops or intraocular), and vaccines. Injectable sumatriptan products limited to those with injection technology. For all products, only vial, PFS, and AI/OBDS are considered.

Considerations:

- If the medicine is sufficiently differentiated, is a self-admin device needed? Is a vial good enough? Is a PFS good enough?
- Biosimilars match the delivery formats of the originators
  - With vials, originator has no option for differentiation
  - With PFS & AI, originator or biosimilar can start a “delivery” differentiation arms race
- Vial + PFS + AI → Specific to competitive therapy areas for self admin such as RA and MS, representing ~12% of total cases
- Currently, there are 6 on body delivery system (OBDS) combination products on the market targeting IV conversion or specific use cases.

Planning for lifecycle management – order of entry of new formats

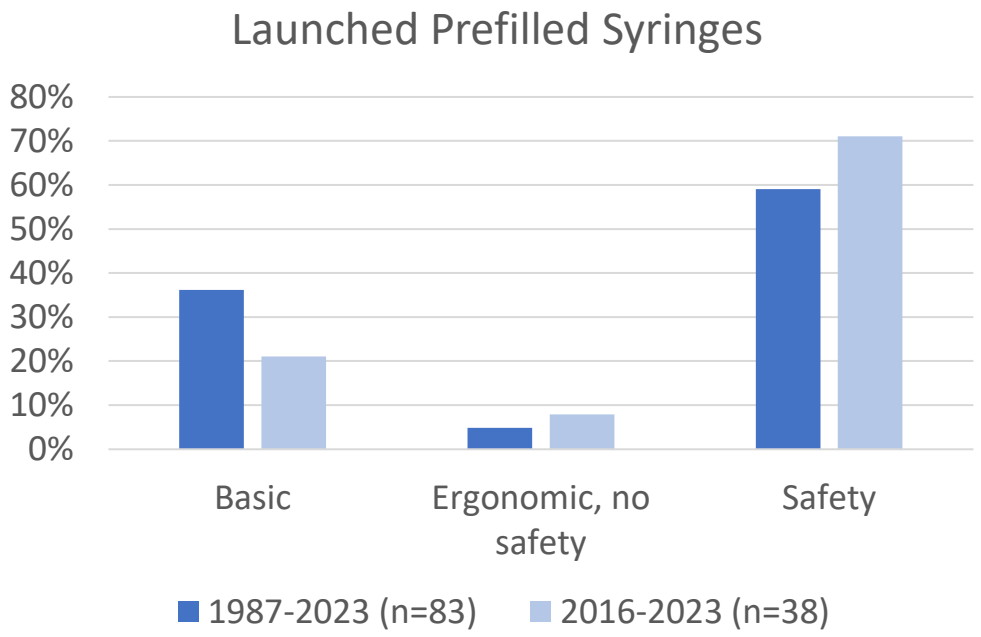


Data Set: The sequence of approval of different formats for parenteral products 1987-2023 (same data as previous slide). Time point t_0 represents product launch while t_1 and t_2 occur during lifecycle management.

Considerations:

- Even with new formats in LCM, older formats are not removed from the market (e.g. an AI does not replace a PFS, rather it supplements it)
- The most common strategies are to (1) introduce a vial and stay with a vial (23%), (2) start with a PFS and stay with a PFS (20%), and (3) start with an AI and stay with an AI (16%). This represents ~60% of cases and only 40% of cases introduce additional formats.

Do we need ergonomics? Do we need safety features?



Data Set: Parenteral approvals, 1987-2023 and 2016-2023 with same criteria as previous slides. The "ergonomic" syringes are for UCB and Lilly products. Safety syringes represent nearly 70% of the total when considering the full period or the most recent 7 years.

Considerations:

- Approximately 60-70% of launched PFS include a safety feature (previously 50% when assessed in 2019)
- There is a modest increase in the trend toward safety features, especially in European markets
- Other than color modifications, the safety syringe products have little to no customization (very little exceptional focus on ergonomics, look and feel, branding, etc)

Panel Discussion

Núria Rodríguez García
Vice President Pricing and Market Access

PERSONAL BACKGROUND

Professional with +20 years of experience in Consultancy and Pharmaceutical Industry in positions related to Market Access & Pricing, Business Development, Business Planning and Market Research.

Education
BA&MBA, Business Administration, ESADE
Master in Health Economics and Pharmacoeconomics, UPF
CEMS Master, Universität zu Köln
Senior Executive Program, PDD in IESE Business School

Roles
VP Market Access and Pricing, Alira Health, Barcelona
Global Insights Director, AstraZeneca, Cambridge/Gaithersburg /BCN
Head of Global Pricing, Alliance Management and Business Planning, Almirall, Barcelona

Skills
Enthusiastic team member with strong team building and collaborative skills who loves working in international and multidisciplinary teams. Driven by an ever-present curiosity and interest in contributing to organizations that transform patient care and health outcomes

Companies I've worked for
PWC, Almirall, AstraZeneca, AliraHealth

Companies I've worked with (Consulting)
Accord, Almirall, Chiesi, Curium, Durect, Esteve, Ferrer, Legacy Healthcare, Mitem Pharma, Moderna, Neuraxpharm, OM Pharma, Pierre Fabre, Tecnimede

Therapeutic Areas
Alcohol Related Hepatitis, Allergy, CardioVascular, Dermatology, Fabry's Disease, Hematology, IPP, Metabolic, Oncology, Respiratory, Pain, Parkinson, SNC, Vaccines

Nuria is employed by Alira Health. This presentation represents her professional perspective which may not represent the perspective of Alira Health.

AliraHealth

Device evolution in the inhaled respiratory market

Offering an end-to-end solution

THE BEGINNING

MARKET EXPANSION

PLATFORMS

Understanding THE Customer, Creating Value

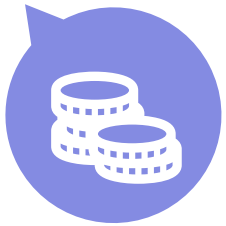
Based on each stakeholder, what are we solving for?

Age Gender
Culture
Lifestyle
Dexterity
Health status

Compliance

VALUE PROPOSITION

Easy to use
Simplicity
Trust



Cost reduction
Effectiveness

Devices can drive differentiation when molecules within a class are perceived as commodities

Panel Discussion

Round table discussion

Where do you see the role of NPP professionals in this kind of development of a device strategy?

- Nuria Rodriguez Garcia: NPP has to have a seat at the table, I think that we have seen devices are elements that take quite a long time to plan for success and therefore being involved in those conversations from a very early stage will be crucial to make sure that everything is taken into account.
- Serkan Oray: we tend to get started around the beginning of phase two in terms of planning for the devices that will be part of the combination product that comes to market. And this is when we desperately need input from NPP in terms of who is the patient, what is needed for that patient population and also who are the competitors that we see and how are we going to differentiate from them. So it's no different than a differentiation kind of plan that you might have from a drug and you know normal competition analysis. But here it adds the additional dimension of what is the device we bring and what is the differentiation that component will also contribute
- Steve Badelt: I think it's important to call out that some of this and your role and where NPP plays into an organization is relative to the size of the organization as well as the drug you're taking to market. In Big Pharma, they've got Pipeline, multiple drugs, multiple therapeutic areas and that can influence, the resources you have, what role you can take the first steps for this group are getting having this device awareness and making sure that you're inserted into the governance process and then new product planning is engaged early on up front.

  If we take diabetes as the far side of the discussion, this group needs to be aware that, with device design and development and if you have the opportunity to create your own device, then you're in a position to put together a number of novel products that were really targeted at the patient. You have the opportunity to develop the product ahead of time and it's a difference in upstream versus downstream marketing from my perspective. If you look at a highly differentiated market with devices and drug products such as diabetes, then these groups have got multiple devices and the marketing commercial team are doing market segmentation (by age, by gender, by ethnicity, it could be anything within the market, could be regional awareness).
  And if you've got a drug that's going to go into a common platform, auto injector and a small company, that's a much different approach that you take as an organization in terms of the organizational construct behind this.
  Then, if you're going to build out an entire program with a portfolio process and potentially even developing your own devices, which is far less common in this industry than the majority of small and medium sized pharma companies.

Round table discussion

Does the IRA influence the launch and life cycle management strategy of drug-device combination and how?

- Serkan Oray: I give the first answer I think for me no.
- And that's because actually, the bigger influence is that everything is accelerated to be more competitive at launch. And I think many of the areas in which we are working today, it is already competitive, there's already product on the market and so you have to really come out and put your best foot forward and even with multiple devices at the same time, I think that you can't really afford to wait and I don't really see that as an IRA dependency. I see that as a competitiveness dependency.

Q&A from the Chat (1/4)

Q1: Could you please elaborate a bit more on the regulatory pathway and 2). is what you presented applicable regardless of the device classification i.e. class I, II, III?

- When considering a drug-device combination product for drug delivery, there is no specific requirement for a device classification. In fact, the device may not even be "approved" on its own because the principle mode of action is from the drug (e.g. an auto-injector with no drug inside is a platform technology which has no medical benefit by itself, unless you're an acupuncturist). However, one must still follow risk-based device development processes (e.g. design control, risk management). From this risk-based approach, most drug delivery systems tend to land in analogy to class I (e.g. oral dosing syringes) or class II (e.g. auto-injectors). However, one could still take the same approach for class III but with stricter risk control considerations.

Q&A from the Chat (2/4)

Q2. What about medical software that are classified as medical devices? What are the nuances, similarities, differences in comparison to a typical medical device?

- Software as medical device (SaMD) follows a similar device regulatory pathway, but most examples of SaMD are not a combination product. Examples of drug-delivery SaMDs include connected devices (e.g. app on mobile device communicating with a drug-delivery device) or possible pill-software applications (e.g. dosing/timing other than reminder-only apps). Usually, SaMDs are brought to market as an independent medical device and follow standard medical device procedures with additional standards and requirement that apply to software. Design controls and risk-based classifications are not all that different and most regions now specifically call out how software is regulated.
- When considering "companion applications" to drug delivery systems, it's very important to consider the so-called "intended use" of the software. If it is purely a communication tool or calendaring application, sometimes it does not qualify as a medical device (but computer systems validation, data integrity, security, data privacy still apply). If the software starts to perform calculations or make medical recommendations, it crosses into medical device territory and will need to be developed as such. Once part of a system or combination product, the regulatory considerations and nuance may be significant and should be considered early in development. Are there elements that are not considered medical device functionality that would be excluded from review?
- The elements to consider are too many to discuss here, however, if compliant design controls are established and regulatory guidance's are followed, software should not be significantly more burdensome than any other medical device.

- However, post-launch management of software changes requires additional processes. These may include new features or cybersecurity updates. How is a company going to manage changes, especially if commercialized globally? Beside the regulatory aspects big differences need to be considered in terms of change control (much more frequent changes) and "manufacturing" resp. deployment. The "constant improvement/constant deployment" concept is fundamentally different to what technical operations of pharmaceutical companies are used to and can be a challenge when calculating business cases. Consider that it may take 10 years to discover a drug, but it only takes a few minutes for a software developer to recompile code and push it to the clould.

Q&A from the Chat (3/4)

Q3. Are there ever concerns about the supply of vials, prefilled syringes and auto-injectors? Or should one assume that these are available in abundance from multiple suppliers? I am trying to understand whether a device could lead to a supply shortage of the product.

- With the exception of the global pandemic, when some vials and syringes were difficult to access due to vaccine prioritization, supply of standard off-the-shelf technologies is usually not a concern. However, once a device is more specific to a product (e.g. non-standard colors or aesthetic design modifications), one becomes locked into the industrial uniqueness of this solution. If one's commercial volume is sufficiently high, there is usually redundancy built into the system (e.g. multiple injection molding tools, multiple assembly lines, potentially multiple CMO partners), but if one is at low-medium volume (e.g. less than 2 million units per year), one is often left holding the industrial risk. If a unique mold or assembly line breaks, it's on you to manage and resolve the risk with your partner. For high value products, one tends to duplicate industrial equipment and even CMOs for redundancy even if the absolute volumes don't demand it.
- While shortages are rare, consider the impact of supplier changes. With single sourced components, any supplier changes that would require regulatory filings could have a significant impact on supply. Secondary sources or alternative components provide a risk mitigation to supplier side process or component changes. Dual sourcing or multiple sourcing can be a challenge though for the primary packaging material within a drug delivery device. Most prominent examples are container closers (tips caps, needle shields) and plunger stoppers. Changing material that is in direct contact with the drug requires large efforts due to additional stability studies and design verification activities.

Q3B. Is there a risk to marketing only a single format? What if there is a technical issue with your device?

- This will depend upon the degree of uniqueness of the single format. Generally, if one selects a reputable format or device that has already been commercialized multiple times, there is limited risk. As such, off-the-shelf platforms are generally very reliable. In the current environment, there are also multiple suppliers for the variants of the common formats so there is plenty of opportunity to shop around for a partner that is best-fit for your company or product.

Q&A from the Chat (4/4)

Q4. How easy/challenging is it to estimate COGs for these more sophisticated modern devices with lots of patient friendly features, especially early on in planning when you are still shaping your pricing strategy and value proposition?

- Estimating COGS is relatively straightforward, even in early development if one selects a common format. For drug device combinations, please remember to include more than just the material cost, but think about the whole cost to create the finished good. For a subcutaneous product this could include: drug substance, filling into primary container (e.g. syringe), cost of primary container, assembly of primary container into delivery system (e.g. auto-injector), cost of delivery system, packing into final secondary and tertiary packaging, and material cost of packaging. Of course, if one selects a more bespoke or unique solution, one can easily under-estimating costs because the final industrial setup may be more complex than expected. Also consider that unit volume effects are very important and device costs will significantly come down with higher volumes. Partners may also give bundled pricing if you have more than one product using their technology, so volume pricing can be negotiated on total volume rather than individual product volume. The reality is that for most products utilizing current platform devices, the costs are easily estimated and rarely would not show a value proposition in a competitive market.
- Novel devices, or even add on technologies (Bluetooth or similar) are significantly more challenging and offer a less obvious value proposition. The use of wireless technology for adherence tracking is an example where, in concept, increased adherence would easily cover component costs of the technology but that hasn't been supported yet in clinical practice. Be cautious with the "shiny new object" when the established standard may provide a equivalent experience. There are several examples of products on the market that have tried to solve a problem that didn't really exist or created more problems (see reusable electromechanical autoinjectors) that added cost of good and complexity where a simple mechanical autoinjector was acceptable to a majority of patients.