FRESH prespective

Conference Presentation
Oncology Forecasting

Oncology Forecasting Part 1:
Design, Modeling and Alignment

Foster Rosenblatt

Oncology Forecasting

Part 1:
Design, Modeling and Alignment

Hosted by:

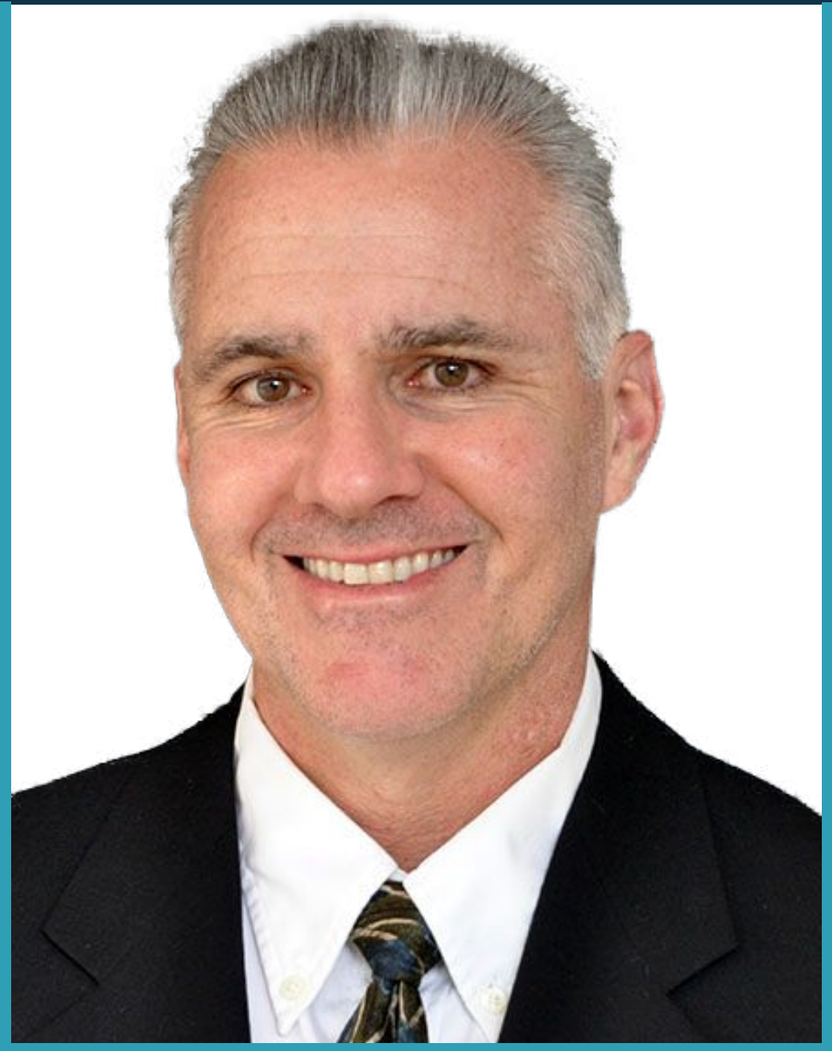
PMSA
PHARMACEUTICAL MANAGEMENT SCIENCE ASSOCIATION

ISPOR QIP PREFERRED INDUSTRY PARTNER 2018

Privileged & Confidential

Foster Rosenblatt

Today's Presenters



Bernie Manente
Associate Partner

Jerry Rosenblatt, PhD
Managing Partner

Foster Rosenblatt

Webinar Overview

- Design Considerations
- Model Development
- Internal Alignment & Guidance

Foster Rosenblatt

Question

What will be the top selling oncology brand in 2019?

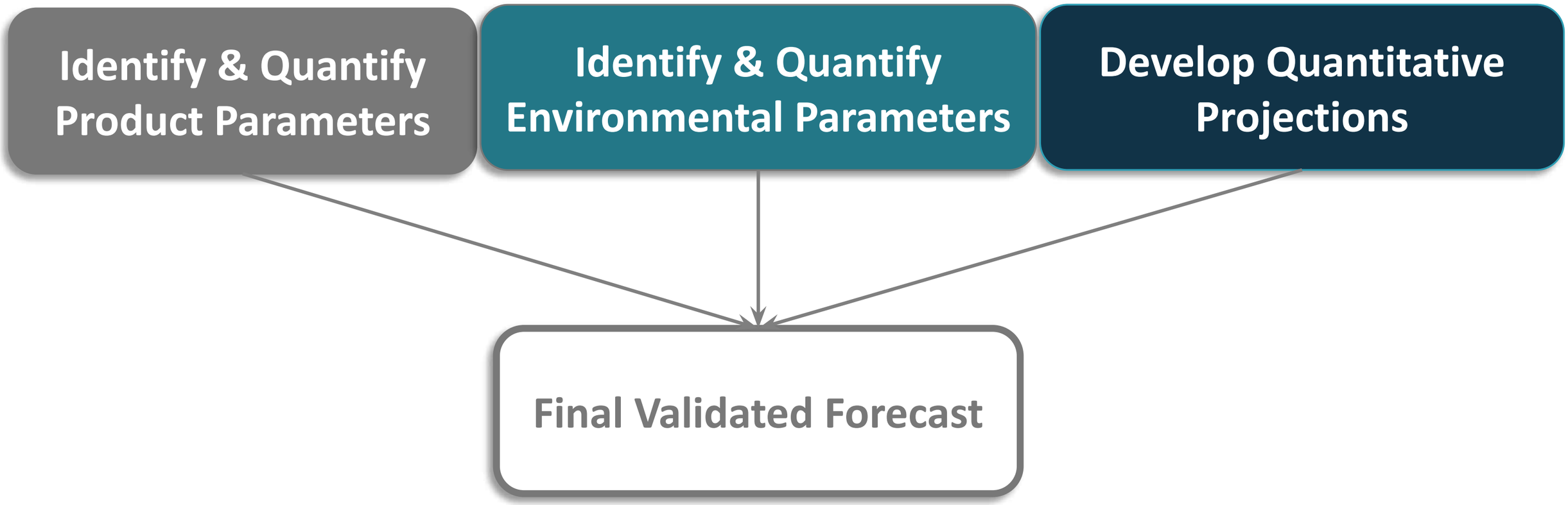
1) *Revlimid*
2) *Opdivo*
3) *Keytruda*
4) *Herceptin*
5) *Not sure*

Type your response into the survey tool

Foster Rosenblatt

Design Considerations

Model design must support the forecasting process which requires forecasters to …



Foster Rosenblatt

Design Considerations

This forecasting process is a mixture of …

"Art"

"Science"

The Oncology forecasting process requires greater elements of both "Art" and "Science"

www.fosterrosenblatt.com

Foster Rosenblatt

Question

What are the challenges when forecasting oncology products?

1) *Harder to determine total patients*
2) *Harder to estimate share*
3) *Harder to model competitive impacts*
4) *Harder to estimate patient subsets (biomarkers)*
5) *Not sure*

Type your response into the survey tool

Foster Rosenblatt

Design Considerations

Key differences in forecasting oncology products

1. The **Clinical Environment** is typically more complex
2. The **Product Profile** and the **Evidence Bundle** cover multiple diseases
3. **Clinical Application** is in flux

} Much more challenging to arrive at a "Market" (treatable patients) definition.

4. Degree of **Unmet Medical Need** drives uptake
5. **Few Comparators** in the universe of products

Foster Rosenblatt

Design Considerations

The oncology forecasting process requires…

"Art" to address

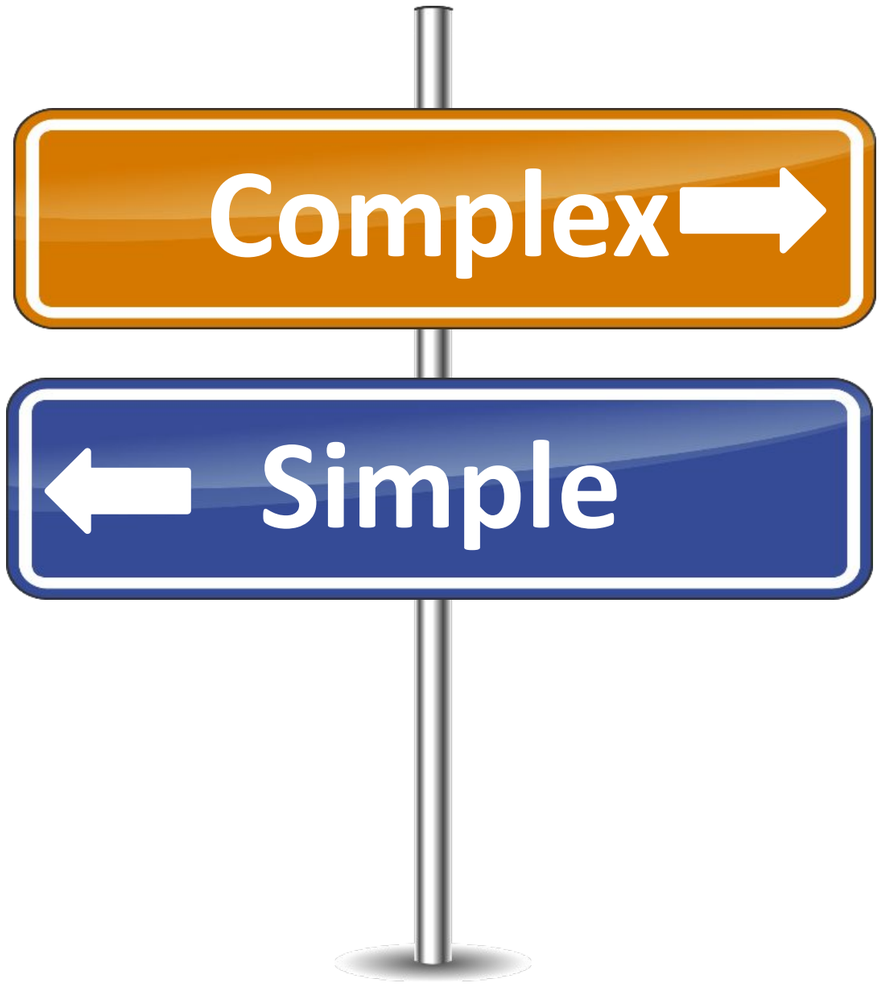
- Translation from clinical evidence to share
- Probability, timing and impact of new indications
- Probability, timing and impact of competitors
- Application of analogs

"Science" to manage

- Quantitative Market projections
  - Units, Sales
  - Epidemiology
    - Incidence, prevalence, survival
- Clinical evidence bundle
- Clinical application

Foster Rosenblatt

Complexity Drives Design



Design considerations are driven by the required complexity of the forecast model

a) Input complexity
b) Output complexity
c) Market complexity

www.fosterrosenblatt.com

Foster Rosenblatt

Input Design Complexity

Driven by corporate desire, but may be influenced by the product(s)

⬅ Simple		Complex ➡
○ Top line directional data	→	○ Detailed forecast by patient subset
○ Single country	→	○ Multiple countries
○ Minimal product input variables	→	○ Multiple product input variables
○ No “Event” requirements	→	○ Event requirements

Foster Rosenblatt

Output Design Complexity

Driven by corporate desire

⬅ Simple → **Complex ➡**

Simple		Complex
○ One or two forecast outputs (Dollars/Patient)	→	○ Multiple forecast outputs (Patients, Gross and Net Dollars, MGs, Share)
○ Single country/single currency	→	○ Multiple countries & currencies
○ No Subsequent Analysis of Outputs	→	○ Additional analysis of outputs: Waterfall analysis, tornado plots, sensitivity analysis, What if scenarios

Foster Rosenblatt

Market Design Complexity

Based on the profile of the product or portfolio being forecast

⬅ Simple		Complex ➡
○ Single Product, Single Tumor	→	○ Single Product, Multiple Tumors ○ Multiple Products, Multiple Tumors
○ Stable treatment environment	→	○ Evolving treatment environment
○ Data does not support accuracy (a reality for rare tumors)	→	○ Data permits more accuracy
○ Readily available patient proxies (incidence, deaths)	→	○ Challenging patient proxies (prevalence, new biomarkers)

Foster Rosenblatt

Model Development

The Link to Design

Model development must address design considerations and follow a structured process

Foster Rosenblatt

Question

What are some of your biggest challenges with forecast model development?

1) *Process takes too long*
2) *Models are not transparent*
3) *Models are too complex*
4) *Models are too inflexible*
5) *Models do not give me what I need*

Type your response into the survey tool

Foster Rosenblatt

Model Development

These steps in oncology forecasting process have been proven to produce the best results

Structured Oncology Forecasting Development Process

1. Develop the Baseline Market
2. Address required Input and Output Complexity
3. Identify Events (if required)
4. Acquire or Construct the Forecast Model
5. Developing “Reasonable” Business/Forecast Scenarios

Securing internal alignment is an important part of this process at each step and we will discuss this separately

Foster Rosenblatt

Model Development

Baseline Market: Demand or Epi based?

"Market Complexity" will dictate certain development approaches relative to the methodology/model type

Simple Market:

Epi model (static patient flow) or demand model

Complex Market:

Epi model: static patient flow or adaptive patient flow

Foster Rosenblatt

Demand-Based Models

Use demand-based model to determine baseline market opportunity by:

- Sourcing historical "demand data" (TRx, Units, Patients)
- Projecting historical demand data using statistical methods
  - bottom-up (all products individually forecast to build a market)
  - top-down (the entire market forecast as a single entity line item)

Increasingly less common!

Tips

- Best use: well defined, mature markets with robust demand data

Note: In Oncology, a demand methodology may be applied in static tumors/treatment segments with single indication products

Foster Rosenblatt

Epi-Based Models

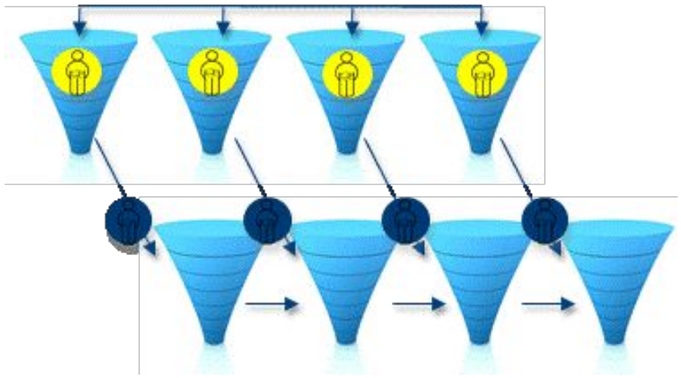
Use epidemiology/patient-based model to create baseline market opportunity using:

- Disease Incidence rates, disease prevalence rates (directly sourced or calculated), biomarker incidence and testing rates, diagnosis rates, treatment and cure rates

2 Types

Static Patient Flow

Adaptive Patient Flow

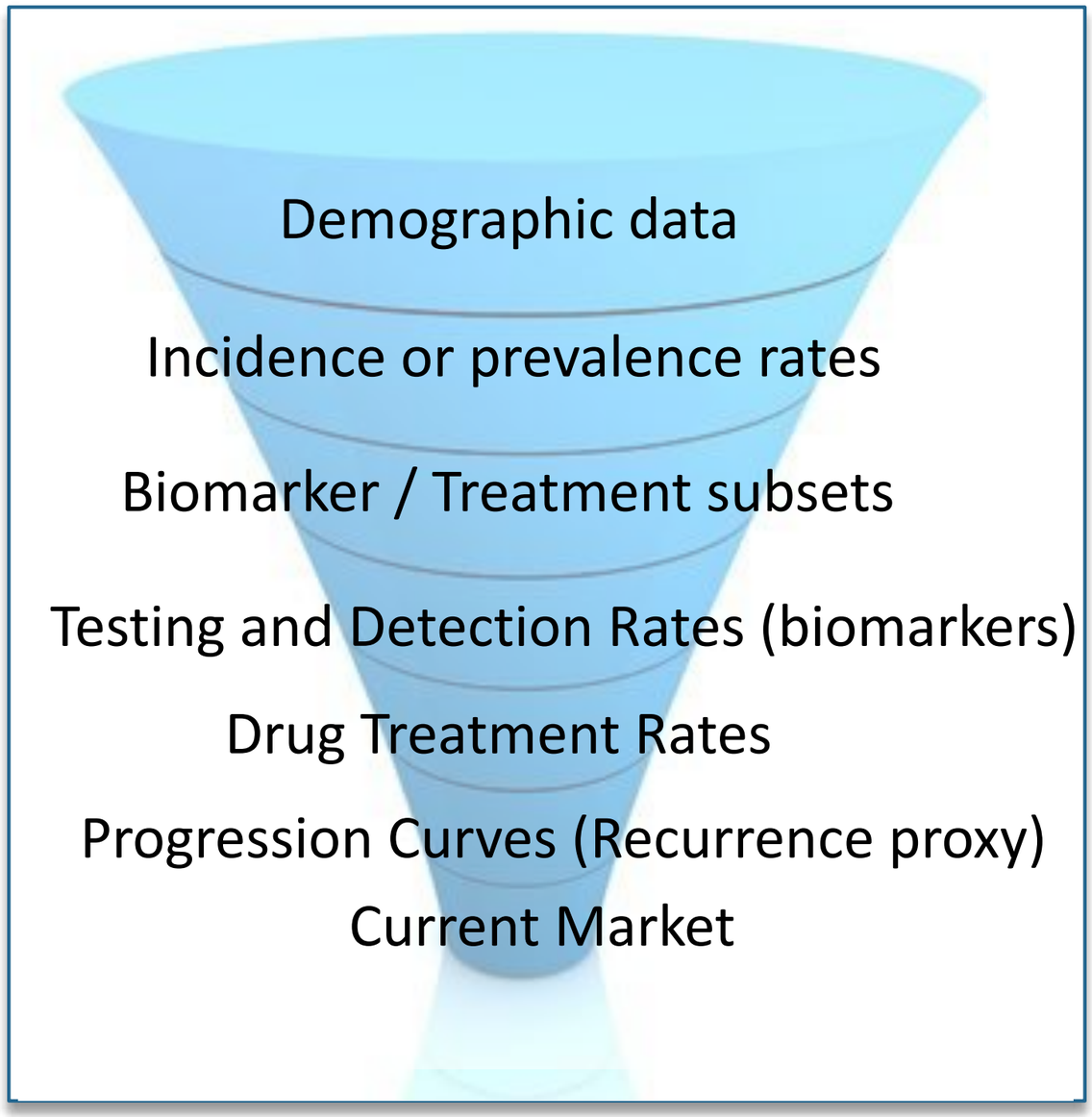


Foster Rosenblatt

2 Epi-Based Approaches

Static Patient Flow Epi-Based Models

- The “market” (treatable pts) is determined through fixed assumptions
- Patient movement is modeled in a linear, deterministic fashion
- Future market dynamics are not modeled
- Development must accommodate these requirements
- Ideal for quick turn-around projections



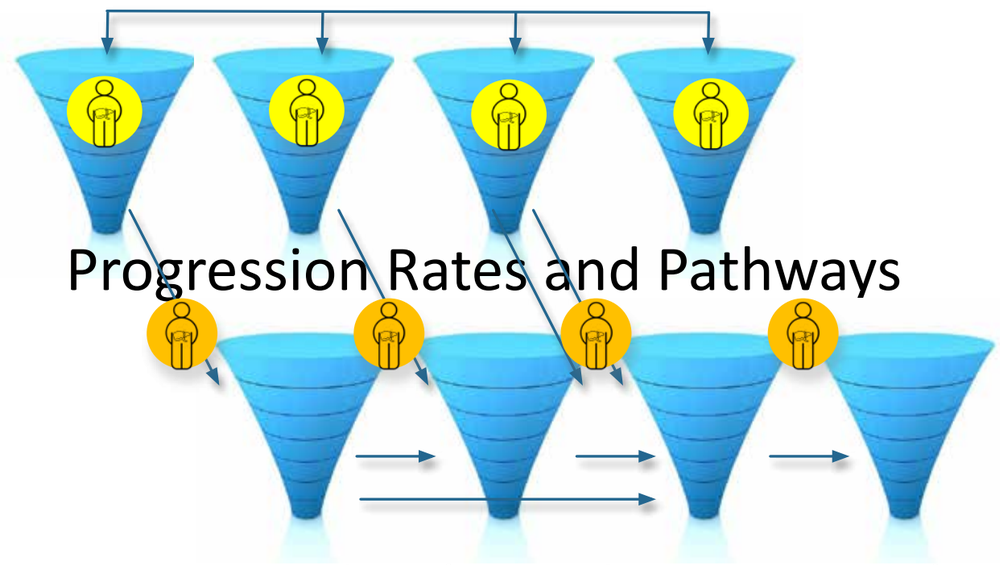
Foster Rosenblatt

2 Epi-Based Approaches

Adaptive Patient Flow Epi-Based Models

- Model uses treatment algorithms to model current and future patient pathways and clinical movements
- Accommodate multiple types of patient progression
- Require more development
- Provides more precise estimates of treatable patients

Flow algorithms mapping distribution by stage, biomarker/treatment subsets, testing and drug treatment rates



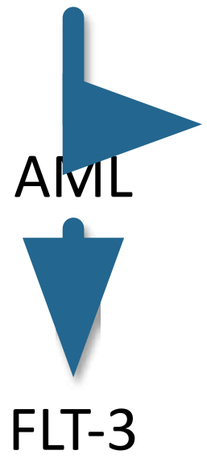
Foster Rosenblatt

A Tale of 2 Forecasts

Small biotech

- Requires $ forecasts by tumour for USA
- Phase III trial – planned 2020 launch

Kinase Inhibitor



Static Patient Flow Epi-Based Example

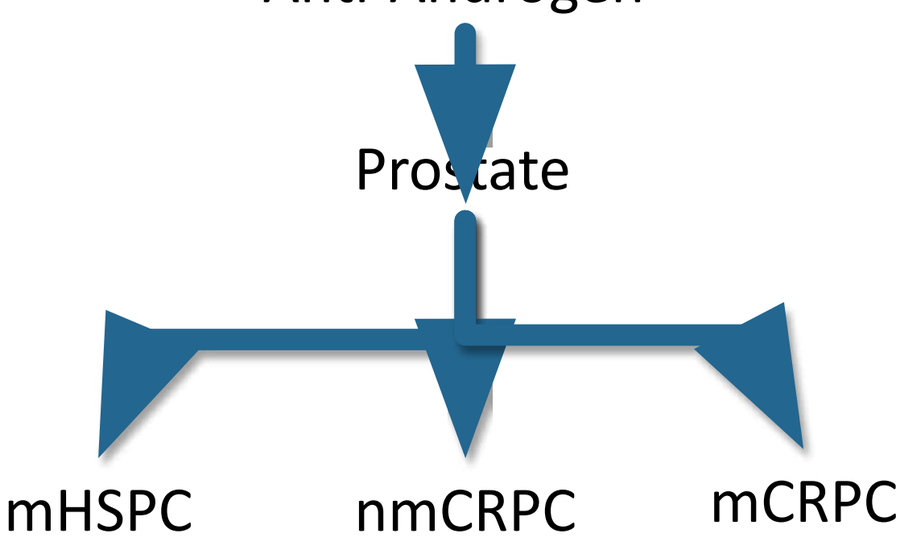
	2019	2020
Newly Dxd AML: Intensive treatment for Induction	19,442	19,520
US, AML - Induction		
% Receiving Intensive Treatment		
Base Case	70.0%	70.0%
% FLT-3		
Base Case	30.0%	30.0%
% Diagnosed		
Base Case	99.0%	99.0%
% Of FLT-3 patients receiving drug treatment for induction		
Base Case	99.0%	99.0%
% Progressing to Consolidation		
Base Case	98.0%	95.0%
Baseline Product Share		
Base Case	45.0%	85.0%

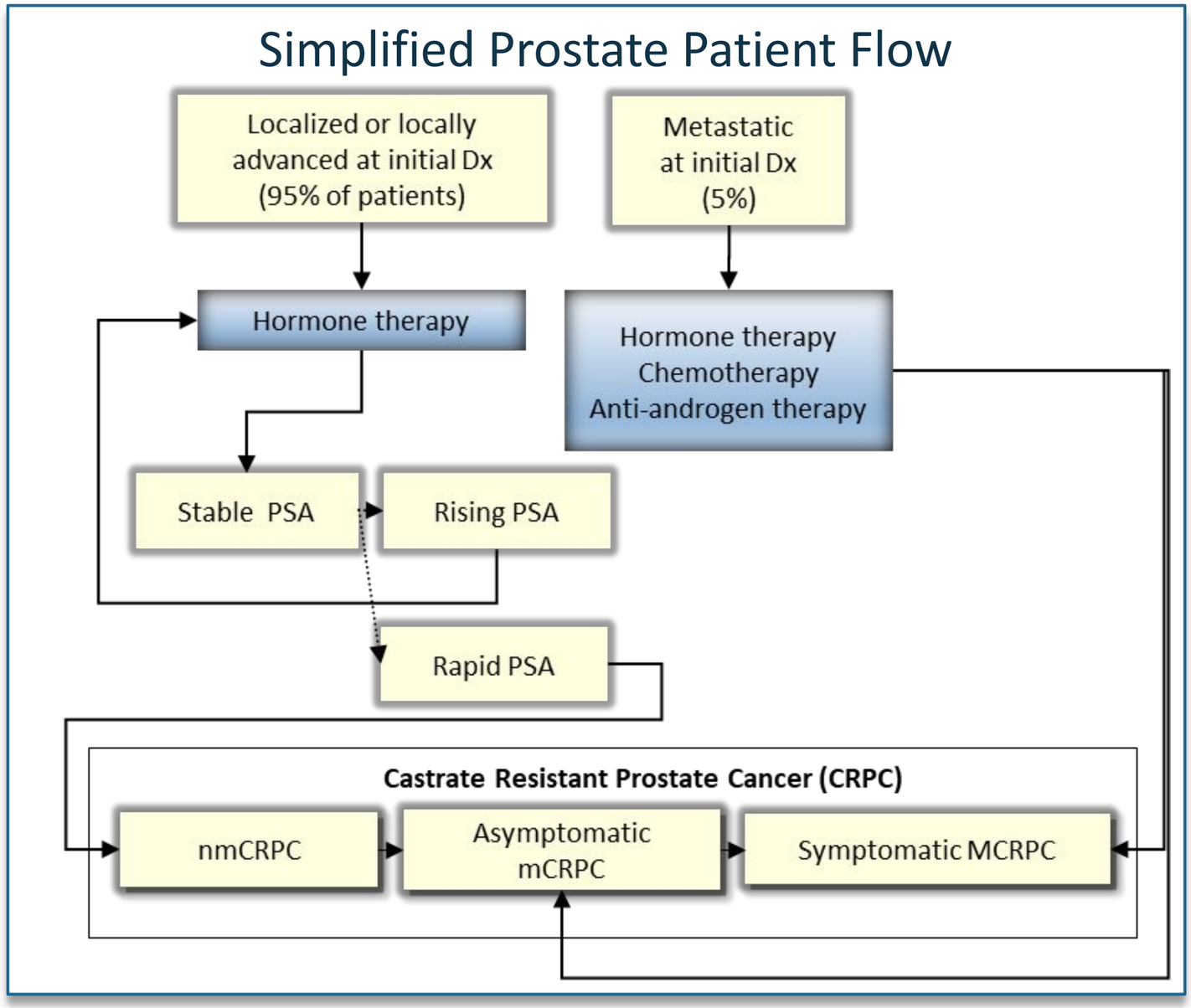
Foster Rosenblatt

A Tale of 2 Forecasts

Large pharma

- Requires forecasts by tumour and patient segment for multiple countries with sensitivity analysis
- Phase II/III trials – multiple launches post 2020





www.fosterrosenblatt.com

Foster Rosenblatt

Model Development

Data Requirements for Models

Demand based models

- Product data ($, units, patients)
- Market data

Epi based models

- Demographic data
- Epidemiology data
- Proxies for patient progression/movement
  - Static patient flow: Recurrence curves
  - Adaptive patient flow: staging, treatment, recurrence rates and curves, and recurrence pathway

Foster Rosenblatt

Model Development

Sourcing Data for Static Patient Flow Epi Models

- Recurrence curves for single flow models
  - Proxy for patient movement to simulate patient flow into a single downstream line of treatment
  - Typically developed as a percentage allocation representing some form of drop off over time (crude simulation of recurrence)
  - Can be sourced from trial data, Kaplan Meier curves, qualitative research data or internal assumptions
- F|R will conduct a 2nd webinar in 1 week covering detailed data sources

Foster Rosenblatt

Model Development

Creating Algorithms for Adaptive Patient Flow Epi Models

- Algorithms are incorporated during development to create models that simulate current and future patient flows

- The model must capture multiple data points including:
  - Stage Distribution at Dx
  - Treatment Distribution or Cluster
  - Recurrence Data by Treatment Cluster
    - ✔ Rates, paths, curves

Foster Rosenblatt

Model Development

Accommodating All Other Product Related Inputs

- Molecule/Brand Share (%), Duration of therapy, Dosage, Pricing, Compliance, SKUs
- Not unique to Oncology but there are some specific twists
  - Share may apply to multiple “markets” and analogs are challenging
  - Duration may be variable
  - Dosing may involve complex down dosing and/or stoppages
  - There may be a multitude of SKUs with variable discounts
  - Development must ensure that these are addressed

Foster Rosenblatt

Model Development

Including "Event" capabilities

- "Events" more require complex development
- Events can represent competitive entrants, new indications and reimbursement impacts
- Events are structured in the development process to act as influencers on baseline product share
- Defined by timing, uptake profile, time to peak, share impact
- Events can provide structure and rigour to complex oncology markets

Foster Rosenblatt

Question

What are the challenges when using analogs in Oncology?

1) *I can't find analogs*
2) *The analogs are close but not exactly right*
3) *I don't have a problem*
4) *Don't know*

Type your response into the survey tool

Foster Rosenblatt

Model Development

Using Analogs as Share Proxies

Variables used to develop analogs outside of oncology often include:

- Product Profile (Efficacy, Safety, Side Effects, Dosing)
- Clinical Unmet Need
- Order of Entry
- Primary Care / Specialty Driven
- Promotional Intensity
- Retail / Hospital
- Acute / Chronic
- Market type : Generic or Branded

For Oncology, you will practically need to use a smaller subset of variables (likely 3-4)

Given the unique dynamics of many oncology markets and products, analogs are often unavailable

Foster Rosenblatt

Model Development

Addressing Outputs

- Complex output = Greater development effort
  - Multiple forecast outputs (Patients, Gross and Net Dollars, MGs, Share)
  - Multiple countries & currencies
  - Require additional analytics
    - ✔ Waterfall analysis
    - ✔ Tornado plots
    - ✔ Sensitivity / What if analysis

Recommend

- Graphical interface
- Data export
- Transparency

Foster Rosenblatt

Model Development

Acquire or Build?

Dependent on

- Budgets
- Timelines
- Capacity for uncertainty
- Need for accuracy
- Complexity

Foster Rosenblatt

Question

What kinds of processes exist in your companies to validate / align on forecast assumptions?

1) *We don't align*
2) *Periodic meetings through the forecast development*
3) *Formal touchpoints in the process*

Type your response into the survey tool

Foster Rosenblatt

Securing Alignment

Developing Reasonable Business Forecasts

- Internal alignment is a key component of “Blessing” the forecast
- Alignment may be based on formal or informal processes
- Must be done at each step in the structured development process (step 1-5)

Foster Rosenblatt

Securing Alignment

Developing Reasonable Business Forecasts

- Alignment with respect to Oncology forecasts can be additionally challenging
- Driven by:
  - Management expectations of patient population
    - ✔ Historical numbers that do not align
    - ✔ Ad Board/KOL opinions
  - Internal processes
    - ✔ Target numbers set pre-launch
  - Proxies from other markets (which do not always transfer)
  - Preconceived notions of peak sales $

Foster Rosenblatt

Securing Alignment

Developing Reasonable Business Forecasts

- Alignment is best facilitated by
  - Transparency
  - Validation
  - Involvement in the process
  - Periodic touchpoints
  - Striving for “reasonableness”

Follow Up Webinar

Oncology Forecasting Part 2: Sourcing, Adapting and Integrating Data
Date: Sept 25, 2019
Time: 12 pm

- Review data and sources to support epi-based oncology forecasting
- Examples for incidence, staging and treatment data
- Discuss securing and integrating data related to patient subsets and survival proxies
- How to review, vet and integrate data
- Examples of an adaptive patient flow epi-based model will be demonstrated

Foster Rosenblatt