

# Forecasting and Data Analytics Round Table Discussion

Parallel Session 6 – Handout  
27<sup>th</sup> June

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## Round table topics

1. **Organising the forecasting process** across the Pharma organisation – assumption communication and consensus
2. **How to communicate strategic forecasts** and illustrate uncertainties to senior management - does Monte Carlo simulation has a role here?
3. Required granularity and scope in **forecasting strategic pipeline and in-licensing assets: US + RoW?**
4. Insights into the application of **Behavioural Economics in Forecasting**



## **Organising the forecasting process**

*across the Pharma organisation  
– assumption communication  
and consensus*

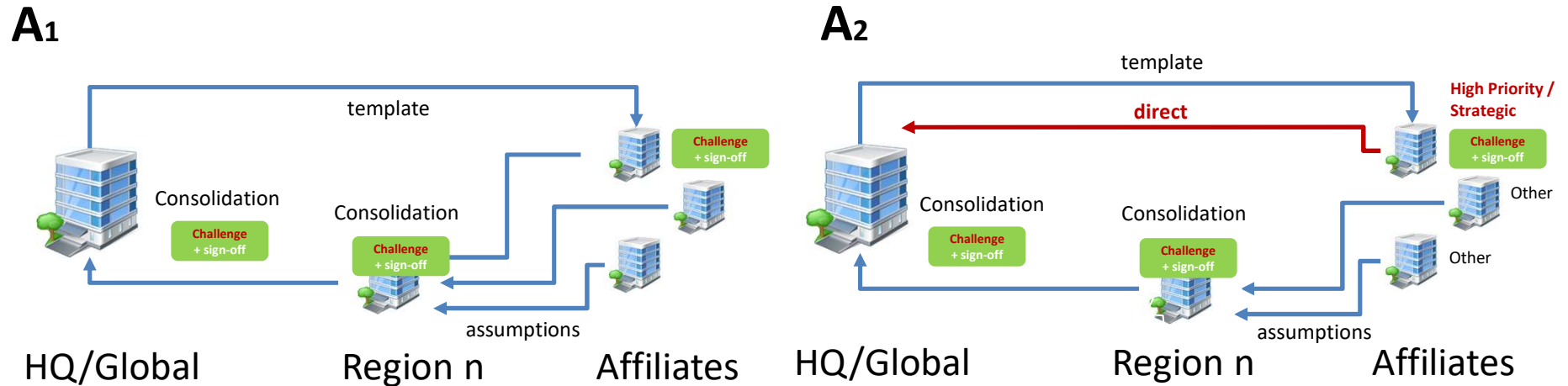
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# Organising the forecasting process

Pharma companies use a number of different models

## Geography Driven Frameworks (simplified)



Source: groupH Ltd. research & analysis

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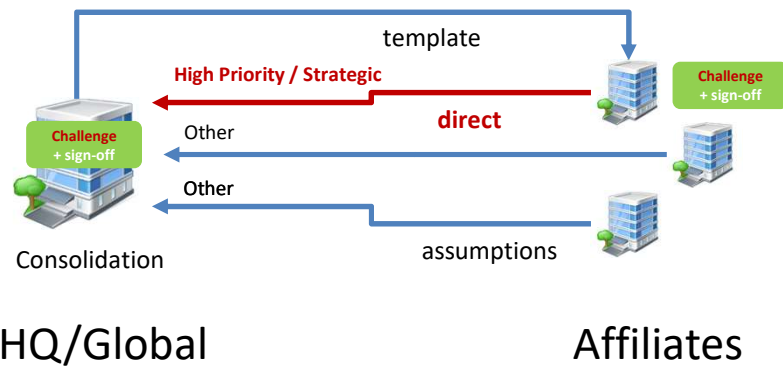
# Organising the forecasting process

Pharma companies use a number of different models

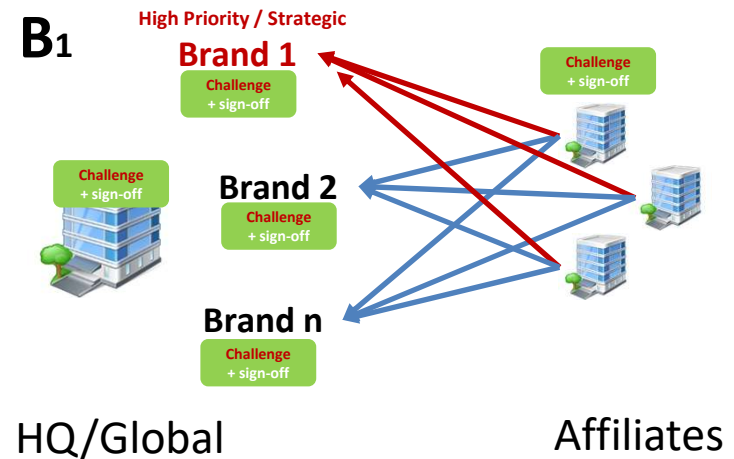
## Brand or Franchise Driven Frameworks

(simplified)

A<sub>3</sub>



B<sub>1</sub>



Source: groupH Ltd. research & analysis

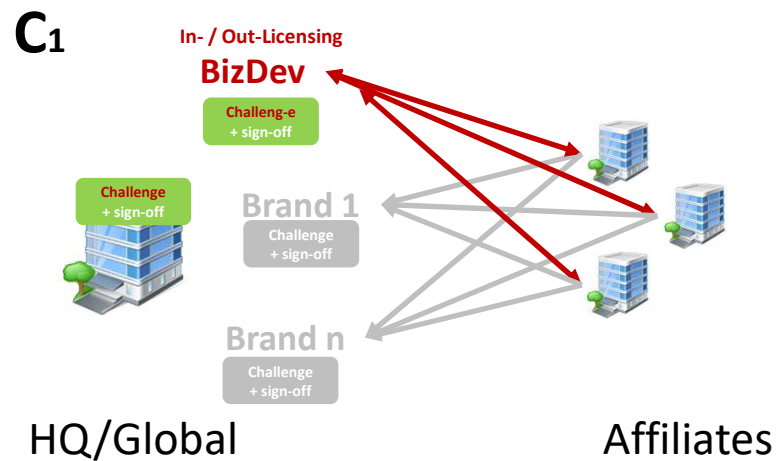
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# Organising the forecasting process

Pharma companies use a number of different models

## Hybrids and Variations (simplified)



Source: groupH Ltd. research & analysis

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## 2. Communication of Strategic Forecasts

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**"Uncertainty is an  
uncomfortable position.  
But certainty is an  
absurd one."**

— VOLTAIRE

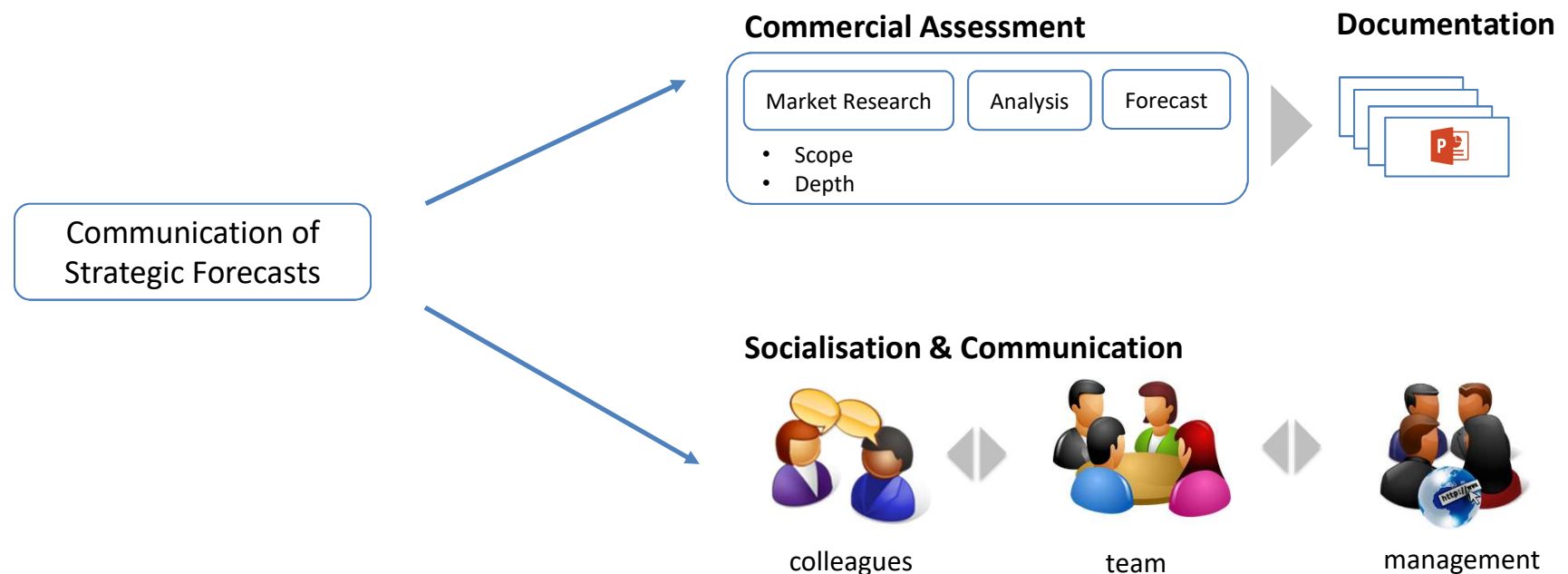
## **How to communicate strategic forecasts**

*and illustrate uncertainties to  
senior management - does Monte  
Carlo simulation has a role here?*

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**There are two aspects: 1. What do you actually do and put on slides for a given purpose?; and 2. How do you 'socialise' the insights to colleagues and management?**



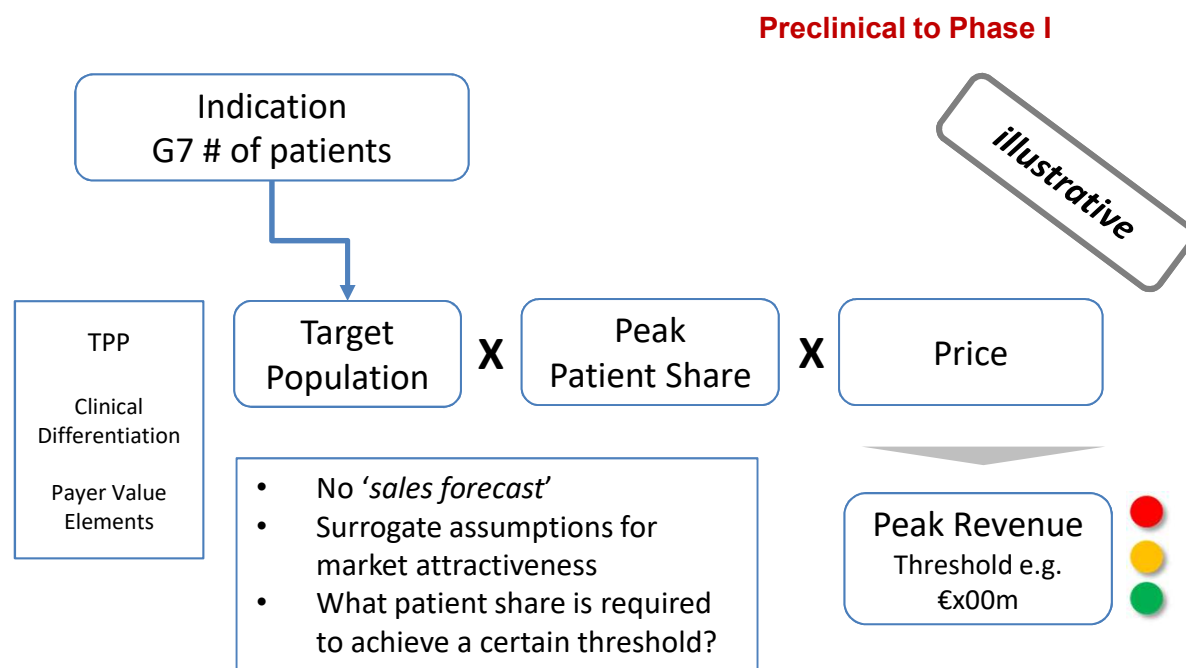
Source: groupH Ltd. research & analysis

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# How can we balance forecast complexity, uncertainty, and transparency?

Pre-clinical to Phase I forecasts may follow a simplified threshold format



## Example

	Patient Share Needed in Overall Population	€x00m Peak Sales Threshold Evaluation
Stage IV Line 1 unselected	5%	●
Stage IV Line 2 unselected	10%	●
L1 Biomarker ≈40%	10%	●
L2 Biomarker ≈40%	30%	●
L3 Biomarker #1 ≈40%	50%	●

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Source: groupH Ltd.  
research & analysis, BI

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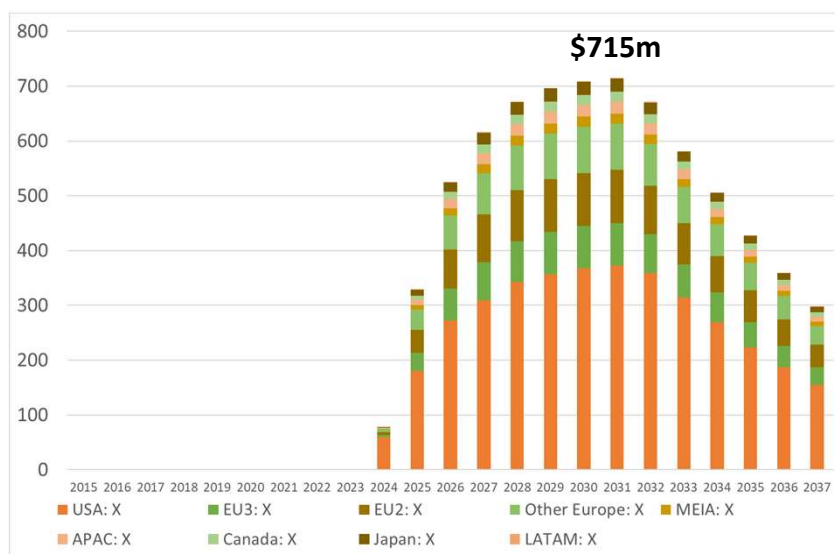
# Phase II - III and launch forecasts have been traditionally communicated through scenarios: base case, high and low case

1980ies/  
90ies

illustrative

## Phase II – III and Launch

Base Case - Global Sales Forecasts for Product X \$m



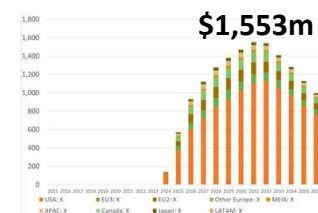
Deterministic Assumptions

	Base		Low		High		
	US	EU	US	EU	US	EU	
LAI Utilization Annual Growth Rate	2%	0.5%	2%	0.5%	10%	0.5%	Acceptance and use of LAIs in the US may theoretically grow at a higher rate
Patient Share 'Newly Diagnosed Patients' *	10.0%	13.0%	9.0%	11.7%	12.0%	15.0%	
Patient Share 'Patients on oral antipsychotic therapy' Switch	10.0%	8.0%	9.0%	7.2%	12.0%	9.6%	Low Case: Impact of JAJ franchise underestimated ** = a relative 10% lower patient share (So 10% goes to 9%)
Patient Share 'Existing Patient on LAI same molecule' Switch	50.0%	35.0%	45.0%	31.5%	60.0%	42.0%	High Case: Better than expected reception to no monitoring and subcutaneous administration - a relative 20% higher patient share
Patient Share 'Existing Patient on other LAI molecule' Switch	15.0%	15.0%	13.5%	13.5%	18.0%	18.0%	
Price Compared to Zyprexa Relprevn (Annual USD cost)	100%	100%	85%	85%	110%	110%	Low case: a realistic price discount for a branded product in a competitive market
Price Compared to Zyprexa Relprevn (Annual USD cost)	100%	100%	85%	85%	110%	110%	High case: above range of annual price increases but realistic in a competitive market
Peak Sales	\$715M		\$547M		\$1,553M		

Low Case



High Case



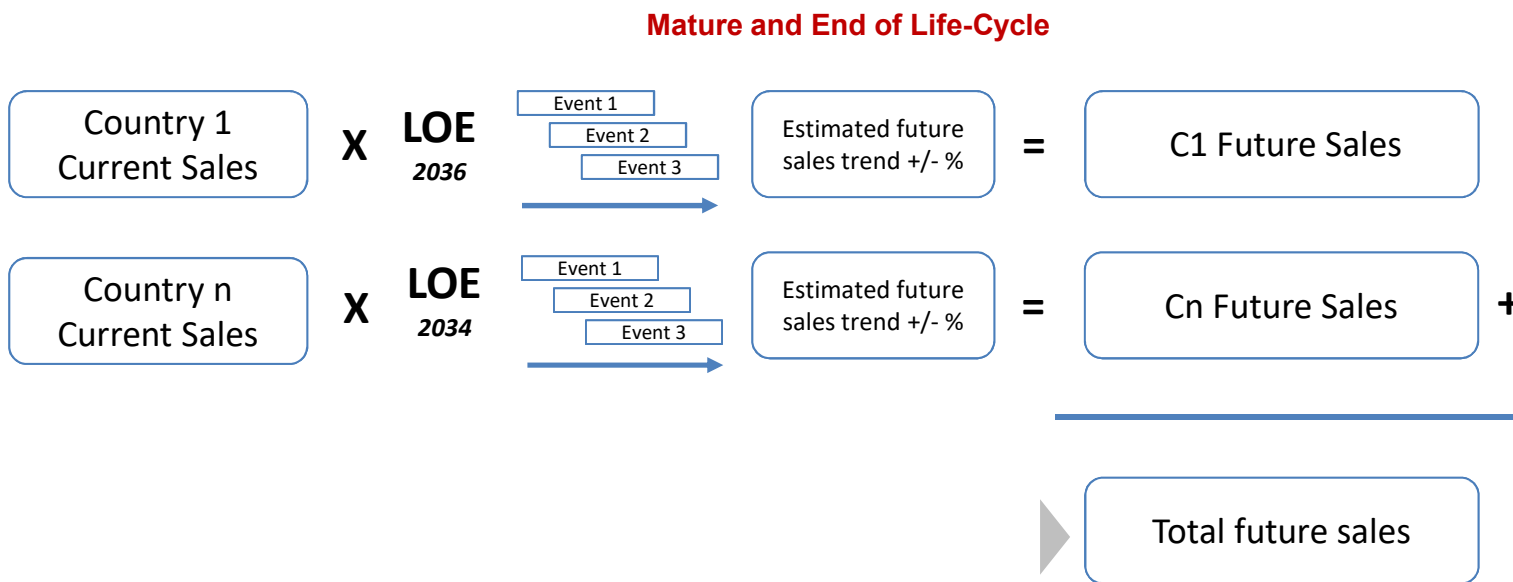
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## Complexity decreases again using trend forecasts and eventing when in-line products approach the end of their life-cycle

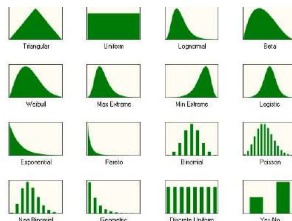
illustrative



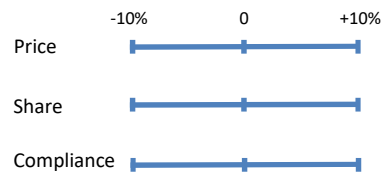
# Certainty / sensitivity can be added as a dimension on top of deterministic key assumptions



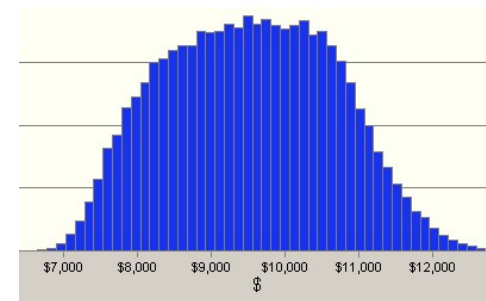
Rational Choice  
[Deterministic Key Assumptions]



[probability distributions]

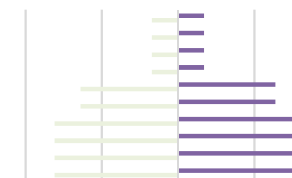


[Key driver sensitivities]



[Monte Carlo Distribution Curve]

-200 -100 0 100 200



[Tornado Diagram]

UK: \$ Cost per Treatment  
UK: HF Incidence  
UK: No neutralising antibodies  
UK: HF LVEF <=35%  
USA: Peak Share: NYHA Class III  
USA: Incident Population by Segment: Class III  
USA: \$ Cost per Treatment  
USA: No neutralising antibodies  
USA: LVEF <=35%  
USA: HF Incidence

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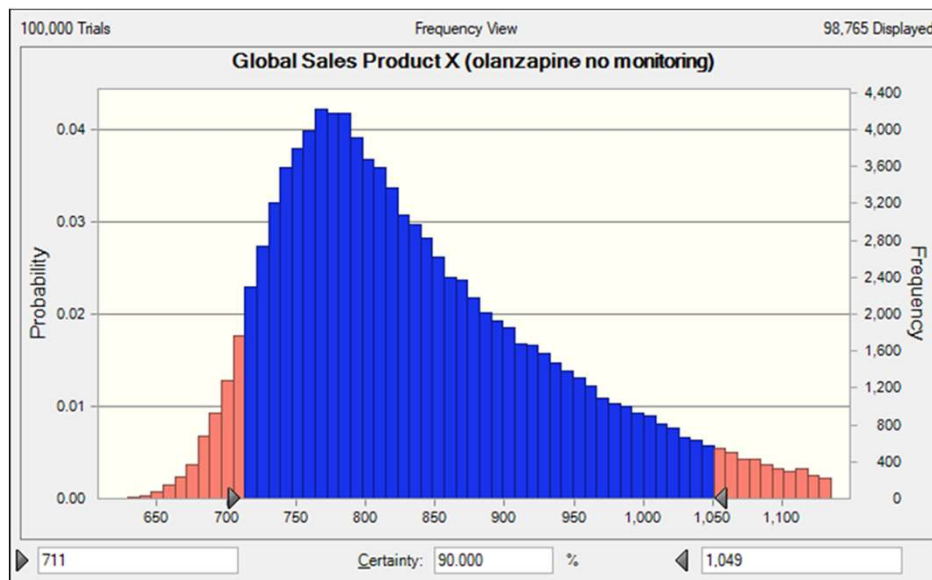
Source: groupH Ltd.  
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... offering a more complete view on potential outcomes

00ies

illustrative



Peak Sales

Base: \$715M

Low: \$547M

High: \$1,553M

### Stochastic Assumptions

Assumption	Region	Parameters	Distribution
LAI Utilization Annual Growth Rate	USA	Likeliest 2%, Min 2%, Max 10%	Triangular
Patient Share 'Newly Diagnosed Patients'	USA	Likeliest 10%, Min 9%, Max 12%	Triangular
	EU	Likeliest 13%, Min 11.7%, Max 15.6%	Triangular
Patient Share 'Patients on oral antipsychotic therapy' Switch	US	Likeliest 10%, Min 9%, Max 12%	Triangular
	EU	Likeliest 8%, Min 7.2%, Max 9.6%	Triangular
Patient Share 'Existing Patient on LAI same molecule' Switch	US	Likeliest 50%, Min 45%, Max 60%	Triangular
	EU	Likeliest 35%, Min 31.5%, Max 42.0%	Triangular
Patient Share 'Existing Patient on other LAI molecules' Switch	US	Likeliest 15%, Min 13.5%, Max 18%	Triangular
	EU	Likeliest 15%, Min 13.5%, Max 18%	Triangular
Price Compared to Zyprexa Relprevv (Annual USD cost)	US	Likeliest 100%, Min 85%, Max 110%	Triangular
	EU	Likeliest 100%, Min 85%, Max 110%	Triangular

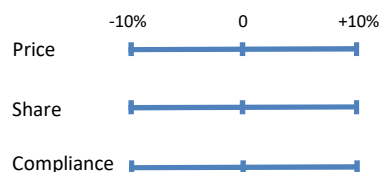
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Source: groupH Ltd.  
research & analysis

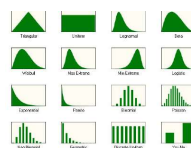
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2010ies+

# Insights on potential prescriber biases and attitudes, pipeline and competitors, market access and patient needs inform decision making



[Key-driver sensitivities]



[probability distributions]

-200 -100 0 100 200



UK: \$ Cost per Treatment  
UK: HF Incidence  
UK: No neutralising antibodies  
UK: HF LVEF <=35%  
USA: Peak Share: NYHA Class III  
USA: Incident Population by...  
USA: \$ Cost per Treatment  
USA: No neutralising antibodies  
USA: LVEF <=35%  
USA: HF Incidence

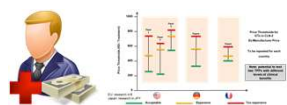


[Tornado Diagram]

[Monte Carlo Distribution Curve]



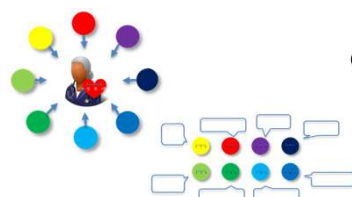
Rational Choice  
[Key Assumptions]



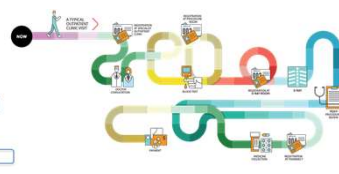
[Strategic Payer Insights]



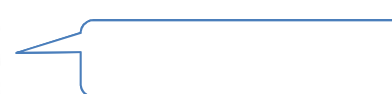
[Competitor + Pipeline Insights]



[Physician bias and attitude parameters]



[Patient needs and attitude parameters / Patient Journey]



[Qualifying needs, bias and attitude parameters of physician peer group and patients impacting on commercial potential and risk]

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Source: groupH Ltd.  
research & analysis

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## ***Socialising* and communicating strategic forecasts – There are some basic upfront questions to take into account**

- How much has this forecast changed since the last update?
- Do we need to see a clearer picture of the differences between the affiliates view of a particular asset and that of global?
- Shouldn't we agree the assumptions that drive the forecast before we do any modelling?
- How many scenarios do we need?

Further reading and inspiration:

Engage, Inspire, Activate, Increasing the ROI of insights - Tom de Ruyck, JH Award winner 2017, and other conference presentations at [www.ephmra.org/resources/conferences](http://www.ephmra.org/resources/conferences)

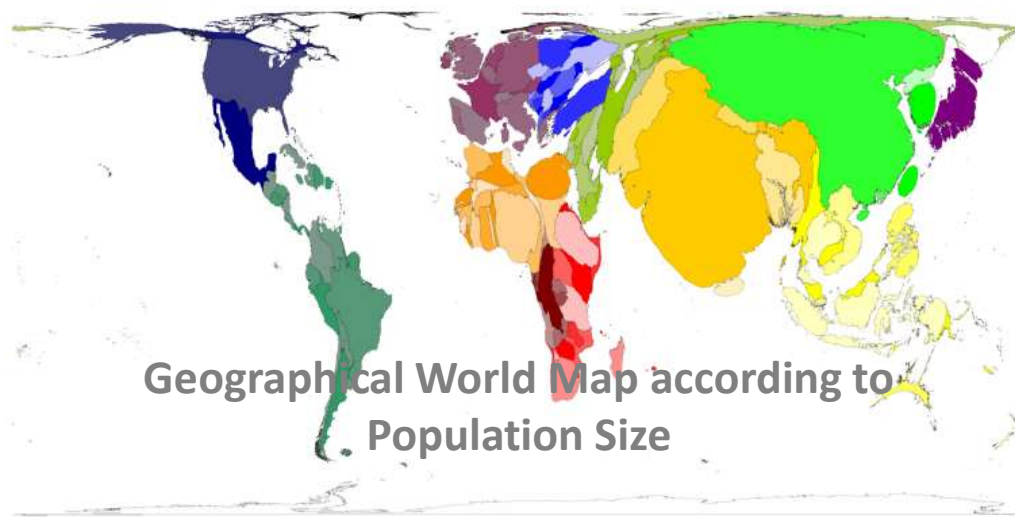
Source: Forecast Insight/Alec Finney, Increasing the ROI of Insights, Tom De Ruyck, EphMrA 2017, JH Award winner, [www.ephmra.org](http://www.ephmra.org)

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### **3. Forecasting strategic pipeline and in-licensing assets: US + RoW**

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*Required granularity and scope in*  
**forecasting strategic  
pipeline and in-  
licensing assets:  
US + RoW?**

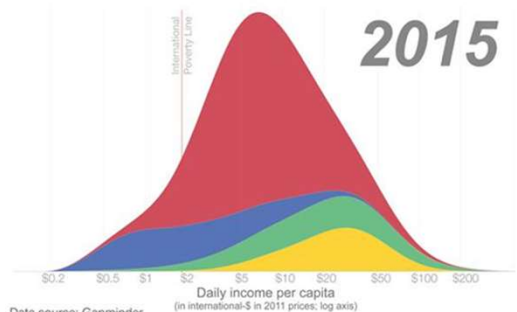
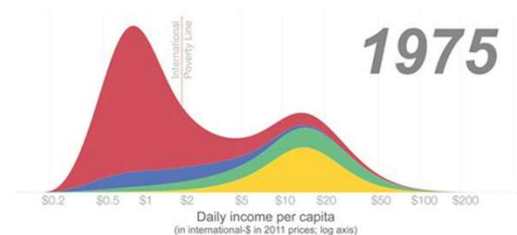
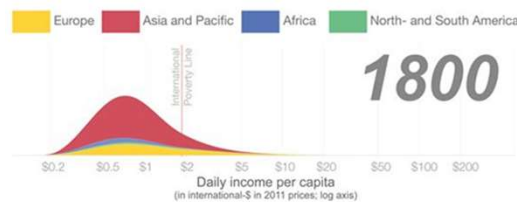
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Source:  
[blog.education.nation](http://blog.education.nation)  
[algeographic.com](http://algeographic.com)

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## Global income distribution in 1800, 1975, and 2015

Income is measured by adjusting for price changes over time and for price differences between countries (purchasing power parity (PPP) adjustment). These estimates are based on reconstructed National Accounts and within-country inequality measures. Non-market income (e.g. through home production such as subsistence farming) is taken into account.

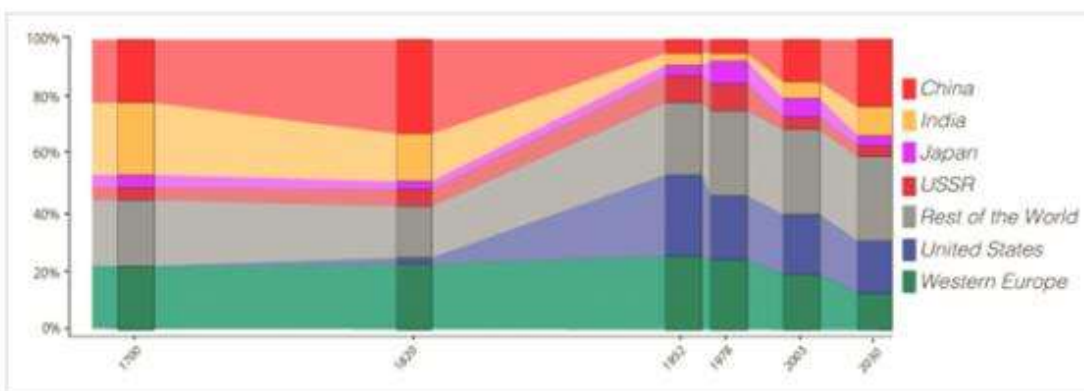


Data source: Gapminder

The visualization is available at OurWorldInData.org where you find more visualizations and research on global development. Licensed under CC-BY-SA by the author Max Roser.

## Macroeconomic trends such as shifts in income distribution over time impact on RoW revenue

Shares of world GDP (% of world total), 1700-2030<sup>21</sup>

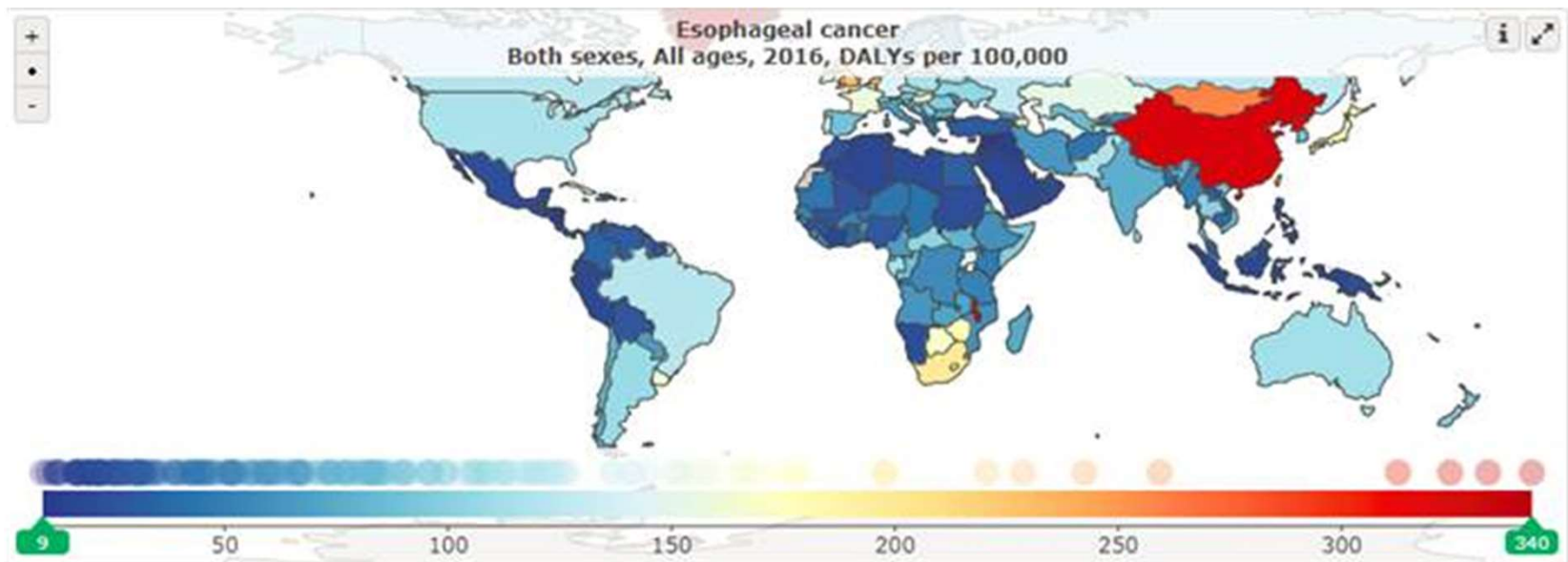


Source: <https://vizhub.healthdata.org>

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... as much as epidemiological variations between regions, which may be significant depending on indication

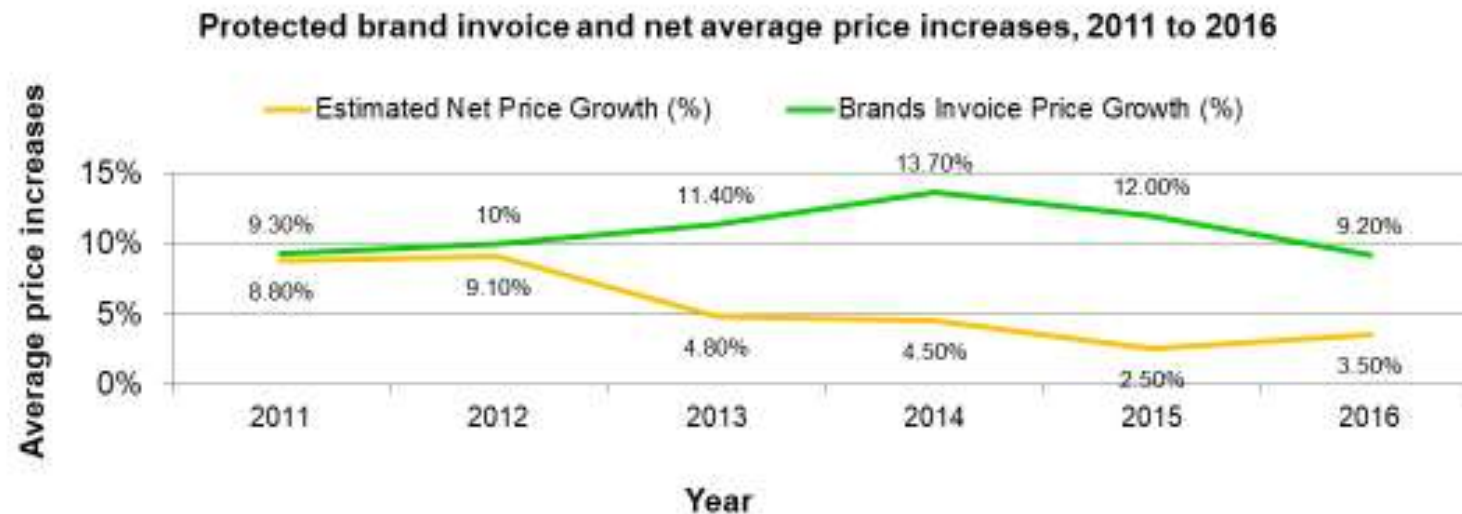


Source: <https://vizhub.healthdata.org/gbd-compare/>

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**While US brand prices may continue to increase, all important net prices show a significant slowing over recent years**

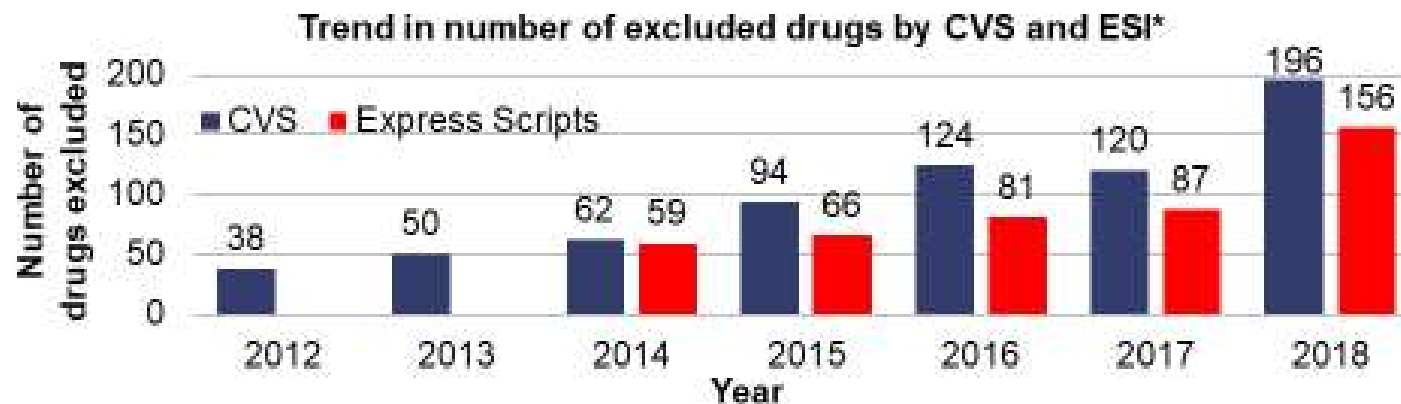


Source: Compass Strategic Consulting Inc. research & analysis, [https://structurecms-staging-psyclone.netdna-ssl.com/client\\_assets/dwonk/media/attachments/590c6aa069702d2d41820000/590c6aa069702d2d41820000.pdf?1493985952](https://structurecms-staging-psyclone.netdna-ssl.com/client_assets/dwonk/media/attachments/590c6aa069702d2d41820000/590c6aa069702d2d41820000.pdf?1493985952)

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**Leading US PBMs continue to increase the number of drugs excluded each year – some solely due to the amount of price increases**

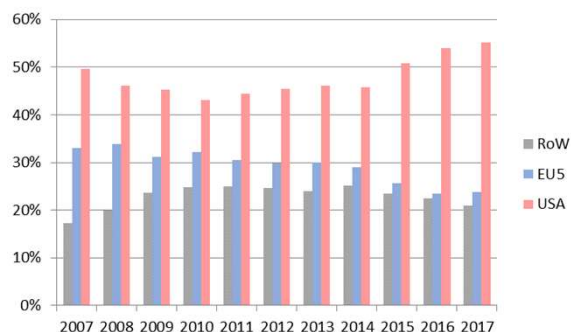


Source: Compass Strategic Consulting Inc. research & analysis, CVS: [https://www.caremark.com/portal/asset/Formulary\\_Exclusion\\_Drug\\_List.pdf](https://www.caremark.com/portal/asset/Formulary_Exclusion_Drug_List.pdf)  
ESI: [https://www.express-scripts.com/art/pdf/Preferred\\_Drug\\_List\\_Exclusions2018.pdf](https://www.express-scripts.com/art/pdf/Preferred_Drug_List_Exclusions2018.pdf)

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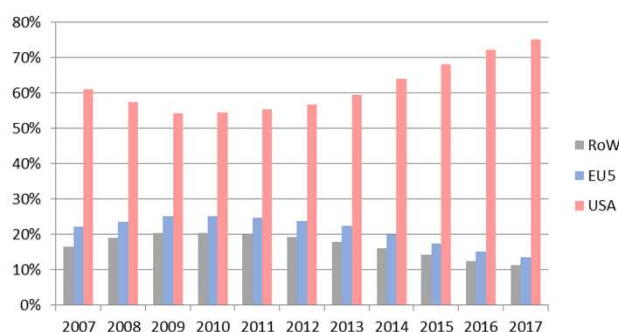
# US oncology and speciality Rx global sales shares appear to increase but gross-to-net discounts may affect the analysis

**Oncology Product Basket**  
2012 – 2017, % of Global Revenue



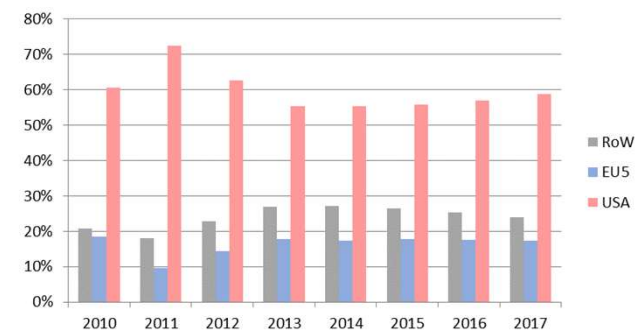
Includes: Afinitor (everolimus), Alimta (pemetrexed), Erbitux (cetuximab), Herceptin (trastuzumab), Ibrance (palbociclib), Keytruda (pembrolizumab), Nexavar (sorafenib), Opdivo (nivolumab), Sutent (sunitinib), Tarceva (erlotinib), Xeloda (capecitabine)

**Specialty Care Product Basket**  
2012 – 2017, % of Global Revenue



Includes: Cubicin (daptomycin), Enbrel (etanercept), Gardasil (HPV), Humira (adalimumab), Kuvan (sapropterin), Repatha (evolocumab), Zytiga (abiraterone)

**Primary Care Product Basket**  
2012 – 2017, % of Global Revenue



Note: 2007 – 2009 excluded as products not yet available in most countries

Includes: Eliquis (apixaban), Jardiance (empagliflozin), Onglyza (saxagliptin), Pradaxa (dabigatran), Praluent (alirocumab), Pristiq (desvenlafaxine), Tradjenta (linagliptin), Trintellix (vortioxetine), Xarelto (rivaroxaban)

Source: IQVIA, analysis based on Global Revenue LC€, Note: IQVIA gross revenue not gross/net adjusted, groupH research & analysis, BI

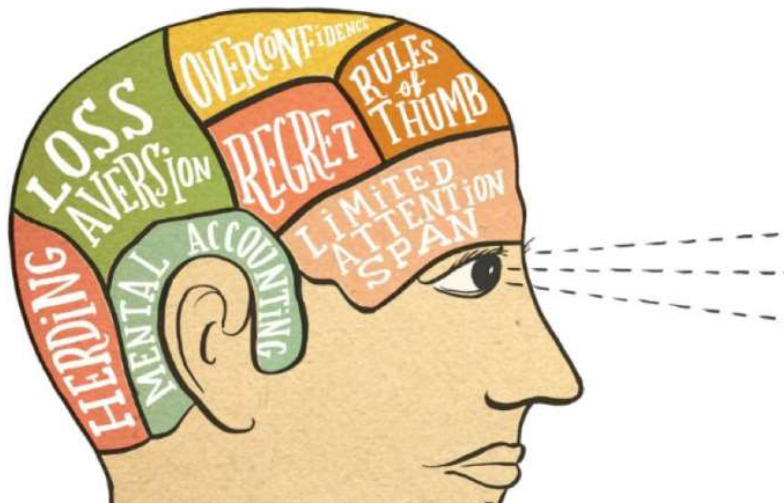
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# 4. Behavioural science in Forecasting

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*Insights into the application of*  
**Behavioural Economics**  
**in Forecasting**

Source: <http://centurionmarketmakers.com.au>

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# Behavioural Economics in the Forecast Process

## Introduction

- Within the last 15 years two researchers (Daniel Kahneman in 2002 and Richard Thaler in 2017) working at the edge between human cognitive science and economic science have won the Nobel prize in Economics for showing that human judgment and decision making systematically deviates (> 90%) from predictions of economic theory and associated rational thought accounts
  - Behaviour varies across time and space, it is subject to cognitive biases, emotions, and social influences
  - Decisions are the result of less deliberative, linear, and controlled processes than we would like to believe
  - Dual-Process Theory: System 1, fast, frugal, heuristic thinking vs. System 2, conscious reasoning
- Does that mean for the strategic planning or forecasting process?**

## In some situations – but not all – unidentified biases can lead to over/under estimations

Selected Examples

- **Emsam / BMS** – MAOI risk bias
  - **Cardioxane / Pfizer** – *'loss of anthracycline efficacy'* myth
  - **Cialis / Lilly** – pricing overestimation
  - **MDD Compliance** – much lower than thought
  - **Mirror Study COPD / Menarini** – symptom reporting
- Avoid bias in the first place
  - If that is not possible, practical or affordable: identify, minimise and adjust for bias

# Behavioural Economics in the Forecast Process

## **groupH project objectives**

**While there is a lot of basic research in BE in general, there is very little that relates to commercial planning**

- Focus on interpreting respondent feedback not on 'nudging' or influencing behaviour
- Educate the groupH team
- Identify relevant biases and heuristics
- Avoid introducing biases during primary research and analysis
- Develop low-bias fieldwork material, processes and improve analysis
- Assess feasibility of quantifying biases through potential discount factor algorithms

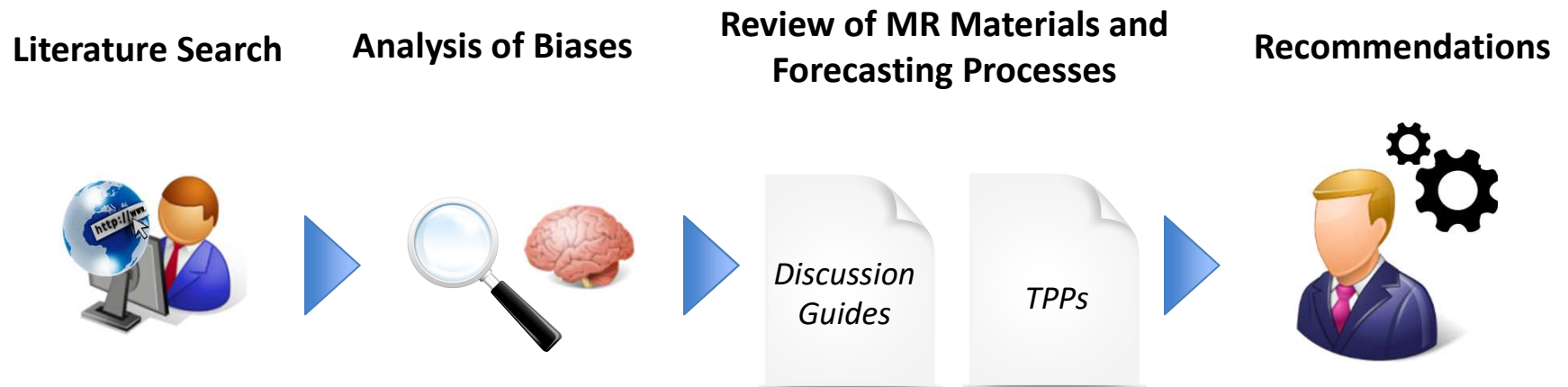
Source: groupH Ltd. research & analysis, \*Joint groupH Ltd. and University of Regensburg/Germany

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# Behavioural Economics in the Forecast Process

## **Approach** (Feb – May 2018)



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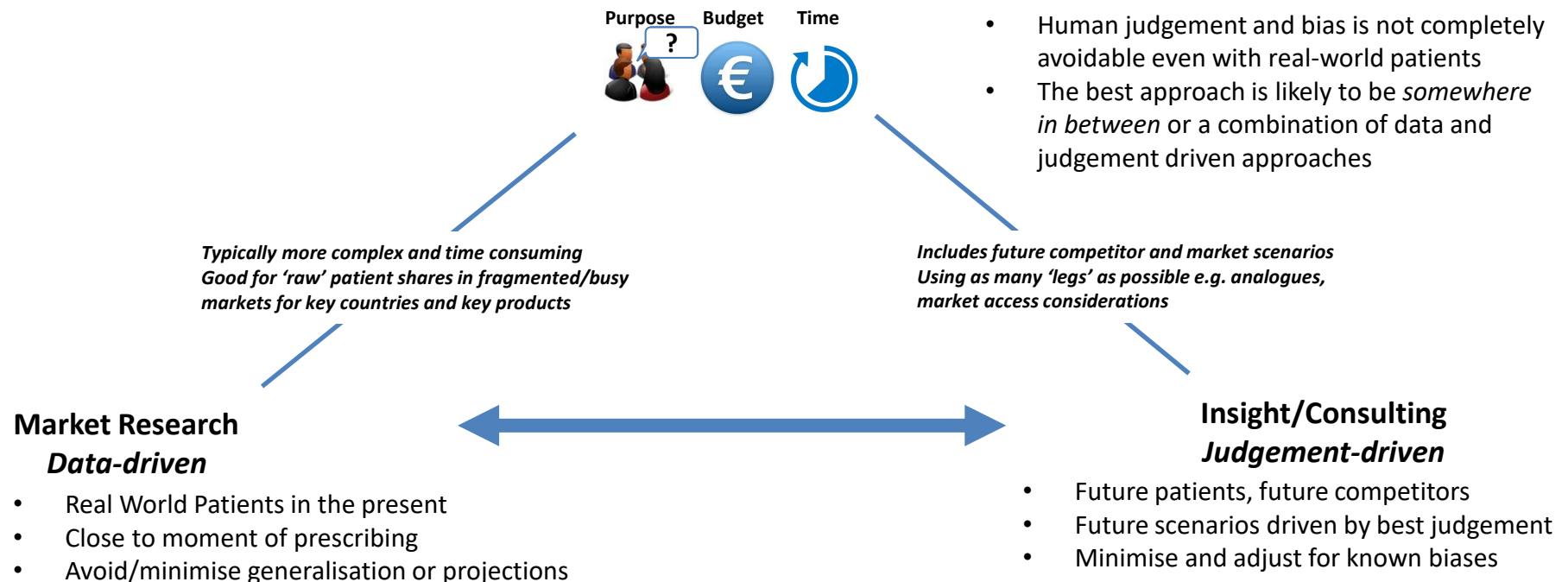
# Behavioural Economics in the Forecast Process

## High level Summary of Outcomes

- From >200 biases, ~30 biases identified relevant to Pharma prescribing
- **Methodological recommendations: Measures to reduce bias by improving fieldwork materials and processes**
- **Qualitative insights** describing physician attitudes and biases flagging up risk of planned behaviour / potential real behaviour deviations
- Outlook: a validated algorithm that improves on the attitude-behaviour problem
  - Theory of Planned Behaviour
- **Potential pitfalls:** *Prescribing biases* not described in literature, potential indication and country specific biases, validation against traditional methods, cost-benefit of creating 'real-life' situations in primary research

## Behavioural Economics in the Forecast Process

**Which approach to take with BE depends ultimately on the questions asked, budget and time available**



Source: groupH Ltd.  
research & analysis

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# Behavioural Economics in the Forecast Process

## Theory of Planned Behaviour



Behavioural Intention Individual Attitude Peer Group Attitude Behavioural Control

$$Bi = (Ai \times PAg \times BCI)$$

DRAFT

Confidence in current SoC

Status Quo and Inertia Bias

Anchoring Bias

Peer Group / Conferences

Market Access /  
Formulary Inclusion

Framing Effects

'Take-the-best' heuristic

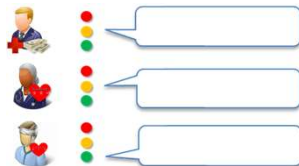
Other Biases

Clinical Guidelines

Prescribing Hurdles

e.g. NICE  
Recommendation

Other local hurdles  
limiting control of Bi



[qualitative insights]

+



[quantification]

Other Peer Group Factors

[quantification]



[quantification]

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