2019 ACTS Annual Report

Statistical Quality Assurance applied to IQVIA's Information Offerings

Global Data Science and Advanced Analytics

(v20200227)

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Welcome

The IQVIA Quality Assurance program **ACTS** - short for *Accuracy and Timeliness Statistics* - has been a cornerstone for many decades in assuring the quality of IQVIA's Information Offerings. This edition is presented in a streamlined layout, focusing on what counts most: *Data, Trends and Outcomes*! Charts presented in this report are mostly self-explanatory and do not require much commentary. Timeliness reported in this edition is measured on number of days after the period the data is available on MIDAS.

ACTS country reports are now available on the IQVIA Customer Portal, with country results being uploaded as soon as data has been thoroughly analyzed and validated. If you are a customer portal user, please visit *ACTS Country Reports* under the MIDAS country coverage section and subscribe to new content by enabling *Manage IQVIA Alerts Subscriptions* under 'My Settings'. In this annual report, you will find single country reports in the Appendix.

This program would not be possible without the help from 3,500+ pharma company affiliates, who provide ex-factory sales for 81,000+ product forms. IQVIA local *Client Service* and *Production* teams work hard with those affiliates in obtaining clients' data for this validation annually. The *Global Data Science and Advanced Analytics* team then analyze, interpret the result and work with IQVIA teams to improve data quality for the future.

My heartfelt gratitude to all the people who contributed to assuring that ACTS has been the one-and-only benchmark for monitoring data accuracy and for triggering and tracking corrective actions. I would also like to thank you for your continuous interest in IQVIA's global quality results. As a unique tool in quality management it publicly shares and drives improvement measures on the IQVIA Information Offerings business, especially for clients dealing with a wider range of countries on MIDAS.

Please read the next page to learn more about what ACTS is. If you have questions about the methodology being used for deriving two core quality metrics *Bias* and *Precision* and for measuring *Timeliness*, please refer to the Methodology section featured in the Appendix. For questions about this quality assurance program, please contact MIDAS Offering Management (MIDAS@iqvia.com), for technical assistance or inquiries about accessing services on the IQVIA Customer Portal, please email eService@iqvia.com.

Yours sincerely,

Yilian Yuan, PhD, MBA

SVP, Global Data Science and Advanced Analytics

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About this report

ACTS is a unique statistical quality assurance program, measuring data accuracy and timeliness of IQVIA's Information Offerings hosted on MIDAS.

What ACTS is:

- ACTS stands for Accuracy and Timeliness Statistics, a globally implemented, standardized and evidence-based quality assurance program that has been in operation for more than 30 years. It validates IQVIA's information offerings of sales data for each product pack registered in a market with the help of pharmaceutical companies.
- The manufacturers participating in the survey supply a total of the ex-factory quantity sold in the validated calendar year for each registered product pack. These are compared with IQVIA's audits. Accuracy and timeliness indicators are derived from the analysis and reported in ACTS.
- It provides cross-national comparability of quality measurements. The validation results are published individually for each country and on the IQVIA Customer Portal and IQVIA Homepage.
- Timeliness of MIDAS data offerings is measured against target values (days after period) in a standardized way and published.
- As a special feature ACTS reports the validity of IQVIA Market Prognosis and its forecasting accuracy.
- The ACTS report is the only quality assurance program in our industry to document the audits' quality and timeliness transparently across countries.

ACTS Data Basis:

	Accuracy				Timeliness
	Countries*	Distribution Channels	Companies	Packs	Deliverables
Region					
North America	2	4	600+	12K	180+
Latin America	10	13	250+	12K	250+
Europe	22	46	1,800+	39K	1,000+
Africa, M. East, S. Asia	12	13	400+	8K	300+
Asia Pacific	8	11	350+	10K	260+
Total	54	87	3,400+	81K	2,000+
Channel					
Retail (Sell-in)	39	40	1,500+	42K	1,000+
Hospital (Sell-in)	8	8	250+	4K	600+
Combined (Sell-in)	11	11	450+	14K	90+
Retail (Sell-out)	10	11	550+	13K	-
Total Market (Sell-in)	1	1	70+	1K	180+
Retail OTC (Sell-in)	16	16	500+	7K	-
Other	-	-	-	-	160+
Total	54	87	3,400+	81K	2,000+

*number of distinct countries

MIDAS: *The trusted industry gold standard in global market measurement*

93	154	10K	1.6M	3.5M
Countries	Distribution Channels	Molecule Combinations	Products	Packs

40 years of local and global experience

120 production heads in 7 countries

Ongoing updates as new/changed products and packs appear:

	PRODUCTS (per year)	PACKS (per year)
NEW	82,000	267,000
CHANGED	46,000	236,000

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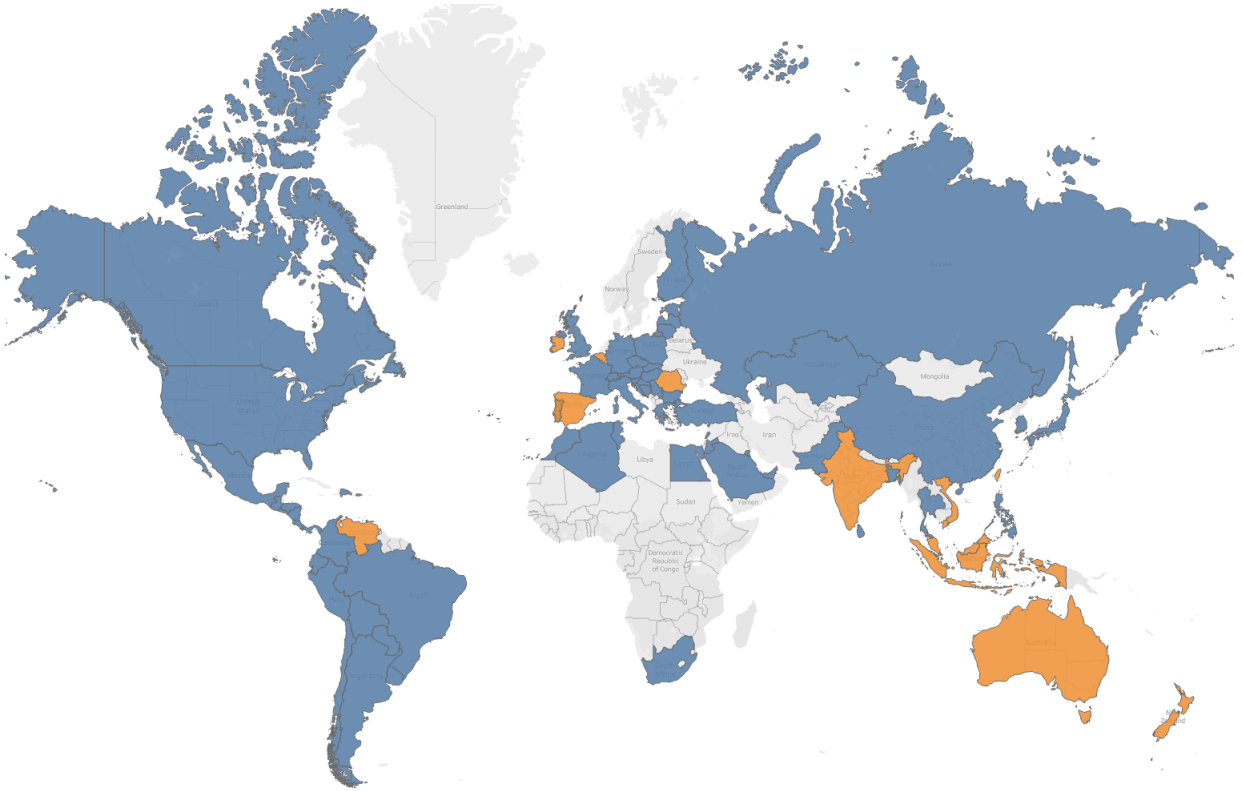
Accuracy: Global & Regional Results

Content covered in this section

Global & Regional	1	Global and regional accuracy results and 5-years trend
Data Type	2	Results by data type (Retail, Hospital, PharmaTrend/Sell-out, OTC)
Countries impacted	3	List of countries with improved or deteriorated results

Regions and Countries validated



Geographical Coverage

Regions covered:

- North America
  - United States
  - Canada
- Latin America
- Europe
- Africa, Middle East, South Asia (AMESA)
- Asia Pacific (APAC)

Countries not covered:

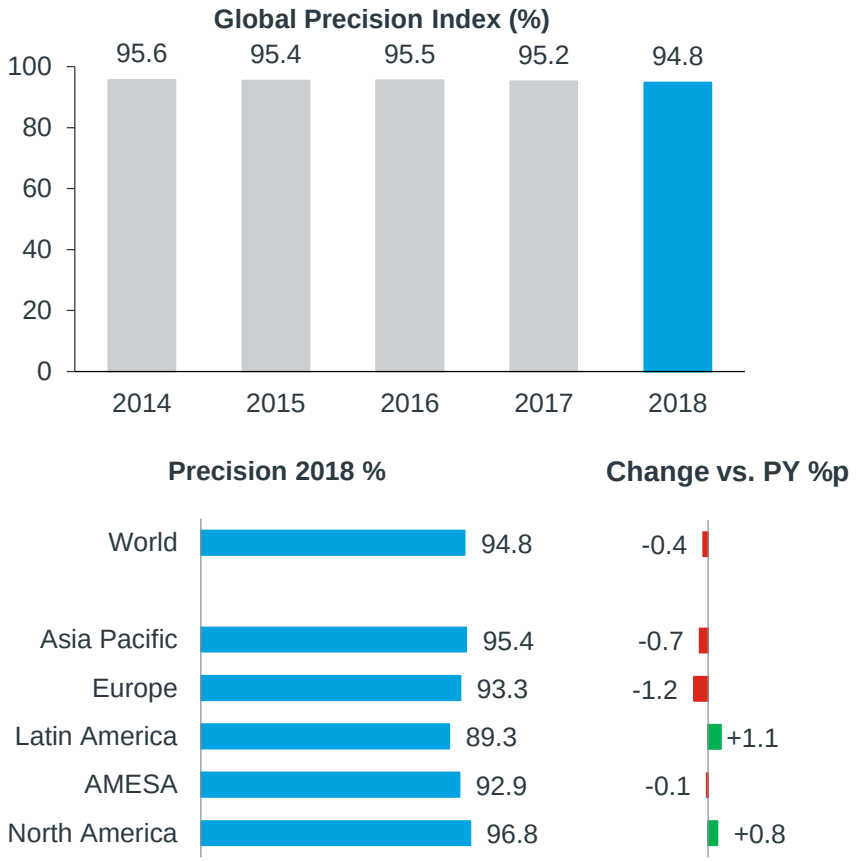
- Australia
- Belgium
- India
- Indonesia
- Ireland
- Malaysia
- New Zealand
- Portugal
- Romania
- Spain
- Sri Lanka
- Venezuela
- Vietnam

Global and Regional Results

Coverage

- A number of IQVIA audit data could not be validated due to lack of previously participating companies in the respective countries: e.g. **Australia, Belgium, India, Ireland, New Zealand, Sri Lanka Venezuela**.
- Countries paused validation of the most recent calendar year as information offerings were undergoing upgrade of data sources or statistical methodologies or both: e.g. **Indonesia, Malaysia, Vietnam**.
- IQVIA could not secure enough participating companies, yet the validation was conducted but not published as the validated market share fell below a minimum threshold: e.g. **Portugal, Spain, Romania**.

Results

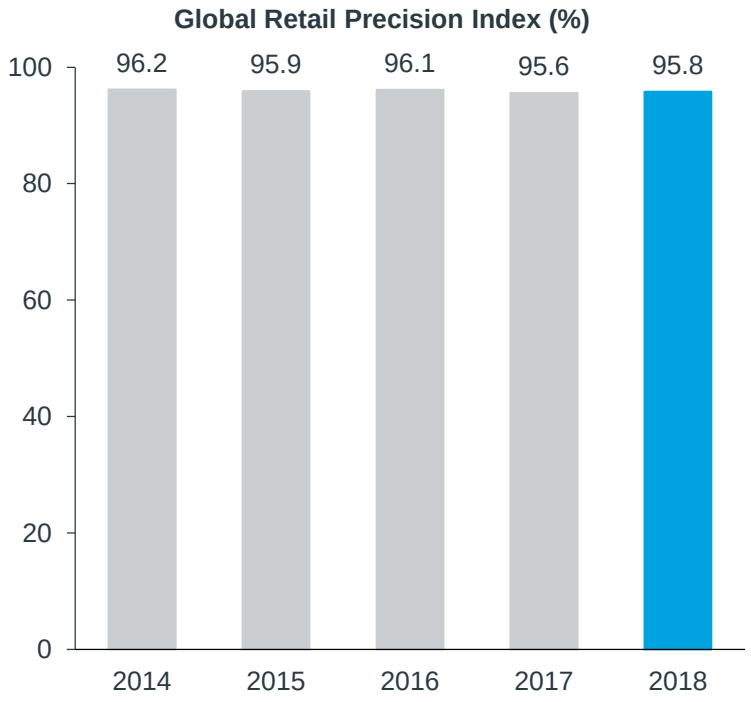


Summary

- Global precision index slightly reduced by 0.4%-points in 2018 but still remains close to 95%.
- 2018 result of 94.8% is lowest in recent years, mainly caused by deteriorations in Hospital and PharmaTrend.
- North America turned out to be the leading region with highest precision of 96.8%.
- Latin America region is ranked with lowest precision of 89.3% but has improved vs. previous year.
- Europe region fell below the 95% threshold and experienced the largest decline in absolute terms.

Countries with improved and deteriorated precision

Retail Validation Results

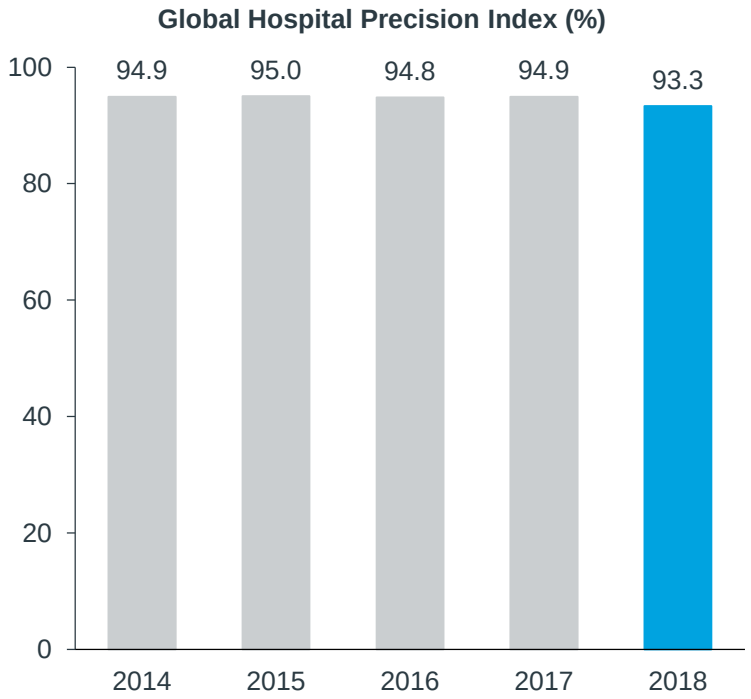


Country	Improvement	
	Precision 2018 %	Change vs. 2017 %p
Bangladesh	77.6	+5.2
Bolivia	56.3	+2.7
Bulgaria	94.0	+4.5
Central America	88.3	+3.8
Chile	96.3	+6.6
Colombia	84.3	+3.5
Greece	91.6	+2.3
Hongkong	80.0	+4.6
Lithuania	98.8	+3.0
Morocco	96.1	+2.6

Country	Deterioration	
	Precision 2018 %	Change vs. 2017 %p
Estonia	81.9	-5.5
Ecuador	91.3	-2.8
South Korea	86.9	-3.2
Paraguay	58.1	-2.6
Uruguay	84.2	-2.5

Countries with improved and deteriorated precision

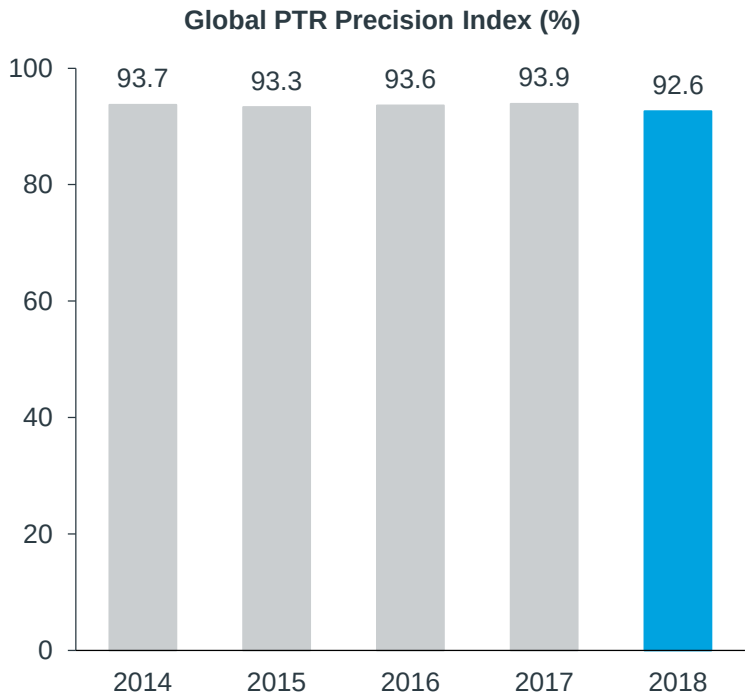
Hospital Validation Results



Improvement			Deterioration		
Country	Precision 2018 %	Change vs. 2017 %p	Country	Precision 2018 %	Change vs. 2017 %p
China	97.5	+1.0	Austria	82.7	-1.5
Serbia	96.1	+1.7	Italy	85.2	-5.6
Slovenia	99.7	+1.6	South Korea	46.9	-3.5
Switzerland	99.8	+1.0	United Kingdom	90.1	-4.3

Countries with improved and deteriorated precision

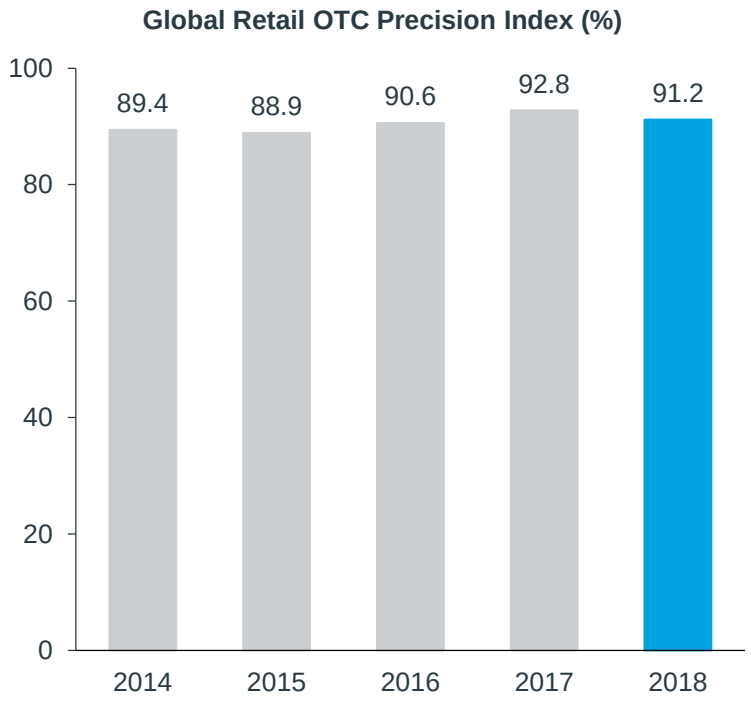
Pharmacy Sell-out (PharmaTrend PTR) Validation Results



Improvement			Deterioration		
Country	Precision 2018 %	Change vs. 2017 %p	Country	Precision 2018 %	Change vs. 2017 %p
Austria	95.9	+1.9	Germany	90.8	-2.8
Poland	89.6	+2.7			
Slovakia	95.4	+2.3			

Countries with improved and deteriorated precision

Retail OTC Validation Results



Country	Improvement		Country	Deterioration	
	Precision 2018 %	Change vs. 2017 %p		Precision 2018 %	Change vs. 2017 %p
Austria	94.7	+2.2	Argentina	85.6	-4.1
Bulgaria	93.2	+12.7	Germany	91.8	-3.7
Greece	83.6	+2.2	South Korea	73.3	-10.0
Mexico	95.9	+3.4	Slovakia	95.7	-2.5
Poland	82.7	+7.3			

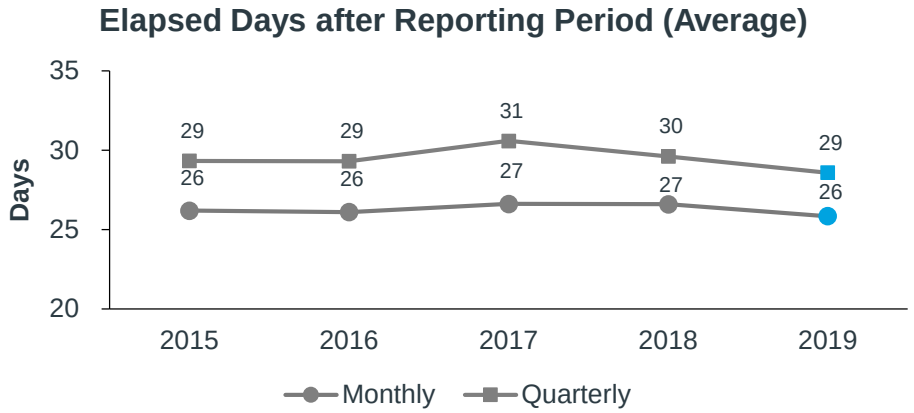
Timeliness

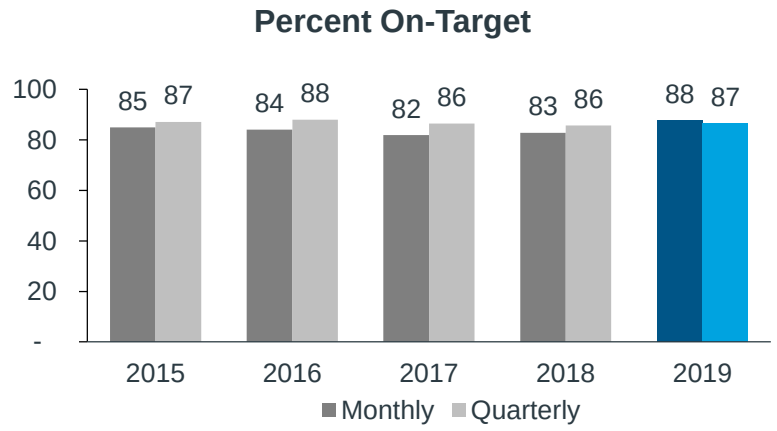
Content covered in this section

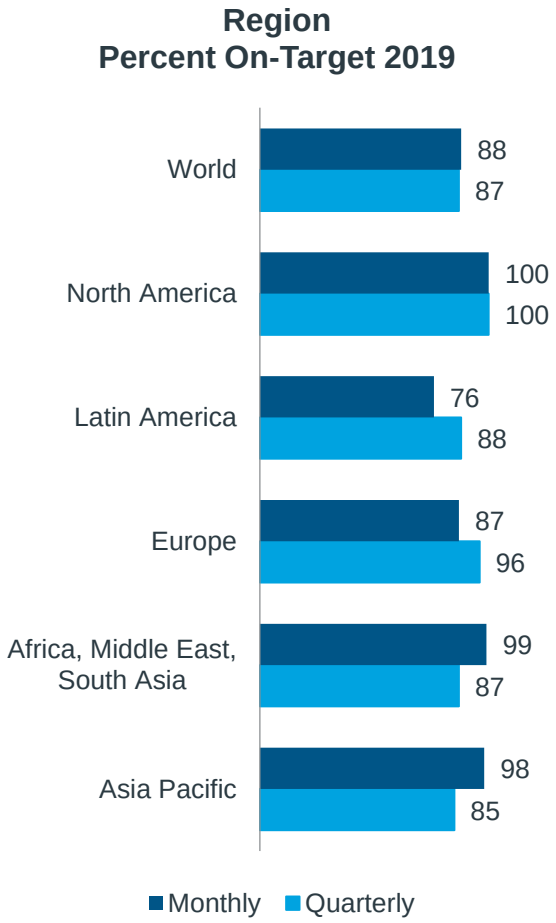
Timeliness	1	Statistics featured in this section pertain to number of days, after the end of the reporting period until time of delivery on MIDAS.
Metrics	2	“Elapsed days after period” and “Percent On-Target” are the two key performance indicators that express Timeliness / speed of delivery on MIDAS.
DAP Data	3	Number of deliverables used for measuring Timeliness: Also reported on IQVIA Customer Portal “MIDAS Delivery Performance”.

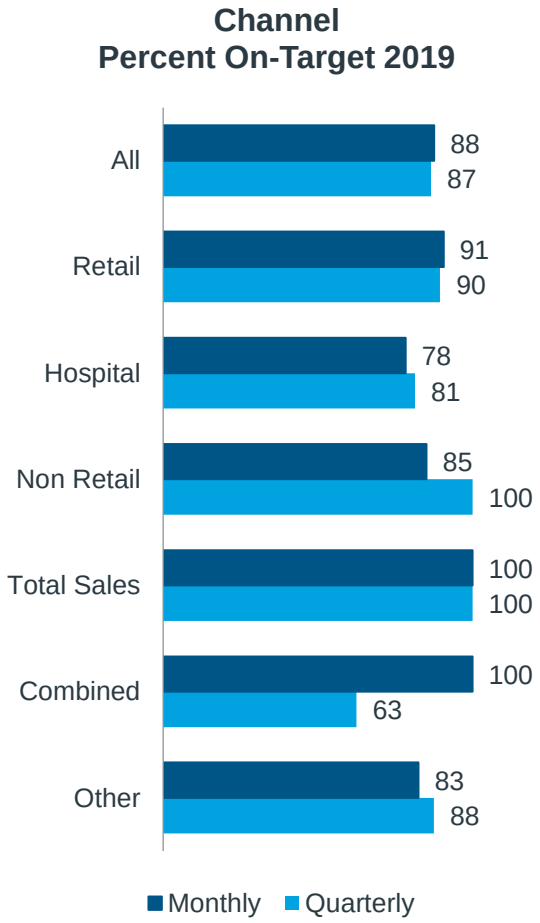
Timeliness being measured against delivery targets of 30 days for Monthly MIDAS and 45 days for Quarterly MIDAS
DAP data being used is also published on MIDAS Delivery Performance: https://customerportal.imshealth.com/sites/imsportal/product-support/midas-products-psa/iqvia-midas/psa/database-update-schedules

DAP improved by 1 day on both monthly and quarterly deliverables. 88% of monthly deliverables were on-time!









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Number of deliverables used for measuring Timeliness

	2015		2016		2017		2018		2019	
	MONTH	QUARTER	MONTH	QUARTER	MONTH	QUARTER	MONTH	QUARTER	MONTH	QUARTER
Channel										
Combined	60	32	60	32	60	32	60	32	60	32
Hospital	439	171	443	172	443	172	444	172	444	172
Non-Retail	36	12	36	12	36	12	36	12	36	12
Other	84	32	84	32	84	32	84	32	84	32
Retail	736	280	744	280	744	280	744	280	741	280
Total Sales	132	48	132	48	132	48	132	48	132	48
Total	**1,487**	**575**	**1,499**	**576**	**1,499**	**576**	**1,500**	**576**	**1,497**	**576**
Region										
North America	132	48	132	48	132	48	132	48	132	48
Latin America	192	68	192	68	192	68	192	68	189	68
Europe	791	263	803	264	803	264	804	264	804	264
Africa, M. East, S. Asia	216	84	216	84	216	84	216	84	216	84
Asia Pacific	156	112	156	112	156	112	156	112	156	112
Total	**1,487**	**575**	**1,499**	**576**	**1,499**	**576**	**1,500**	**576**	**1,497**	**576**

DAP data being used is also published on MIDAS Delivery Performance: https://customerportal.imshealth.com/sites/imsportal/product-support/midas-products-psa/iqvia-midas/psa/database-update-schedules

Specialty Markets

Content covered in this section

Definitions 1

- MIDAS Specialty Definition
- ATC 4th level definition of Specialty products

Global Growth 2

- Specialty vs. Non-Specialty: Market size and market share

Accuracy Results 3

- Bias and Precision by Specialty markets (Anti-TNF, Hep-B & HIV, Oncology and Others)
- Data basis used: Countries and Specialty products surveyed

MIDAS Specialty Definition

Starting point – US specialty definition

- The starting point for the MIDAS specialty definition is the IQVIA USA detailed definition of a specialty product, which includes concepts such as price, involvement of a specialist, form of administration, etc.
- First, the approved indication must be considered to be specialty (chronic and/or complex and/or rare and/or genetic) for a pack to be classified as specialty
- The pack **must then also meet 4 out of 7 other criteria** to be classified as specialty
- These US products have formed the starting point to identify similar products in other countries to assess if they are specialty using the MIDAS definition

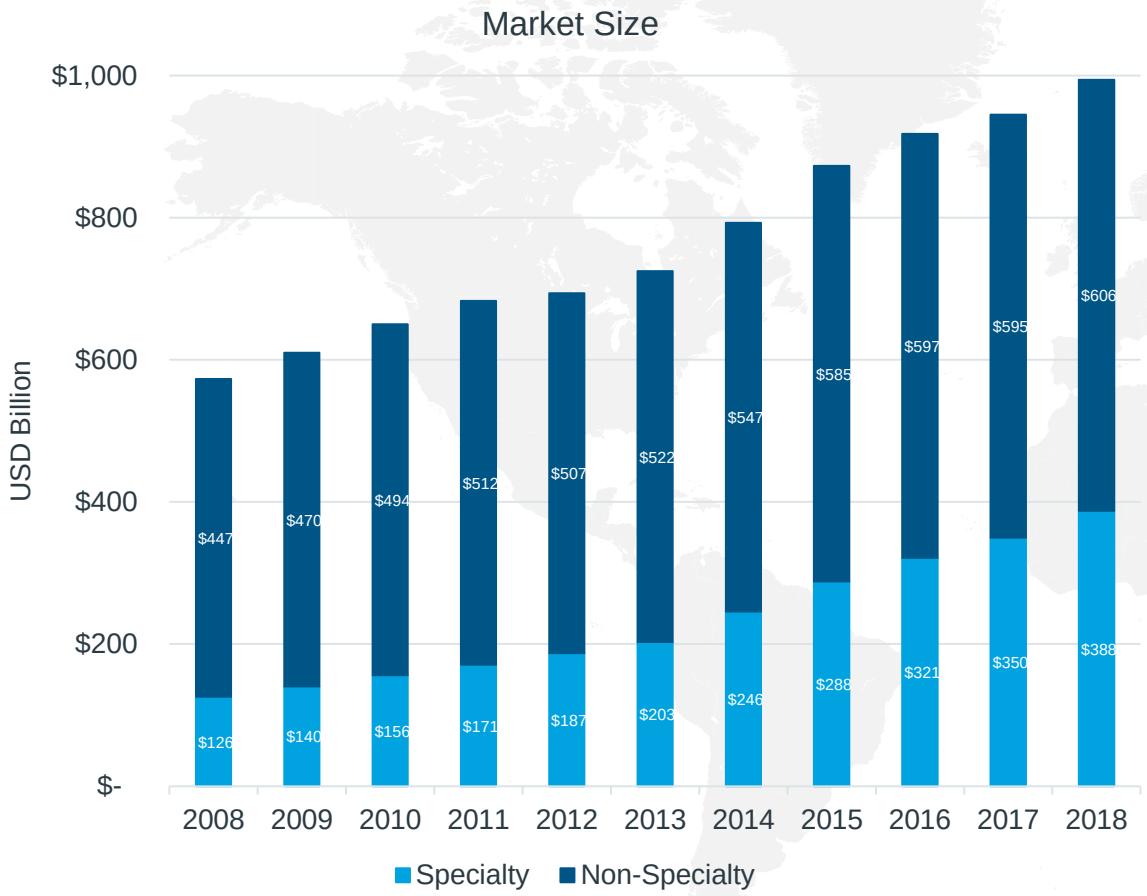
RESEARCHED ATTRIBUTES (US):	
Approved indication is (and/or) chronic, complex, rare, genetic **- REQUIRED -**	Special handling required (refrigeration, frozen, other biohazard)
High annual cost	Reimbursement assistance required
Drug treatment specialist initiated and maintained	Distribution is limited
Practitioner administered	In-depth monitoring or extensive patient counselling required

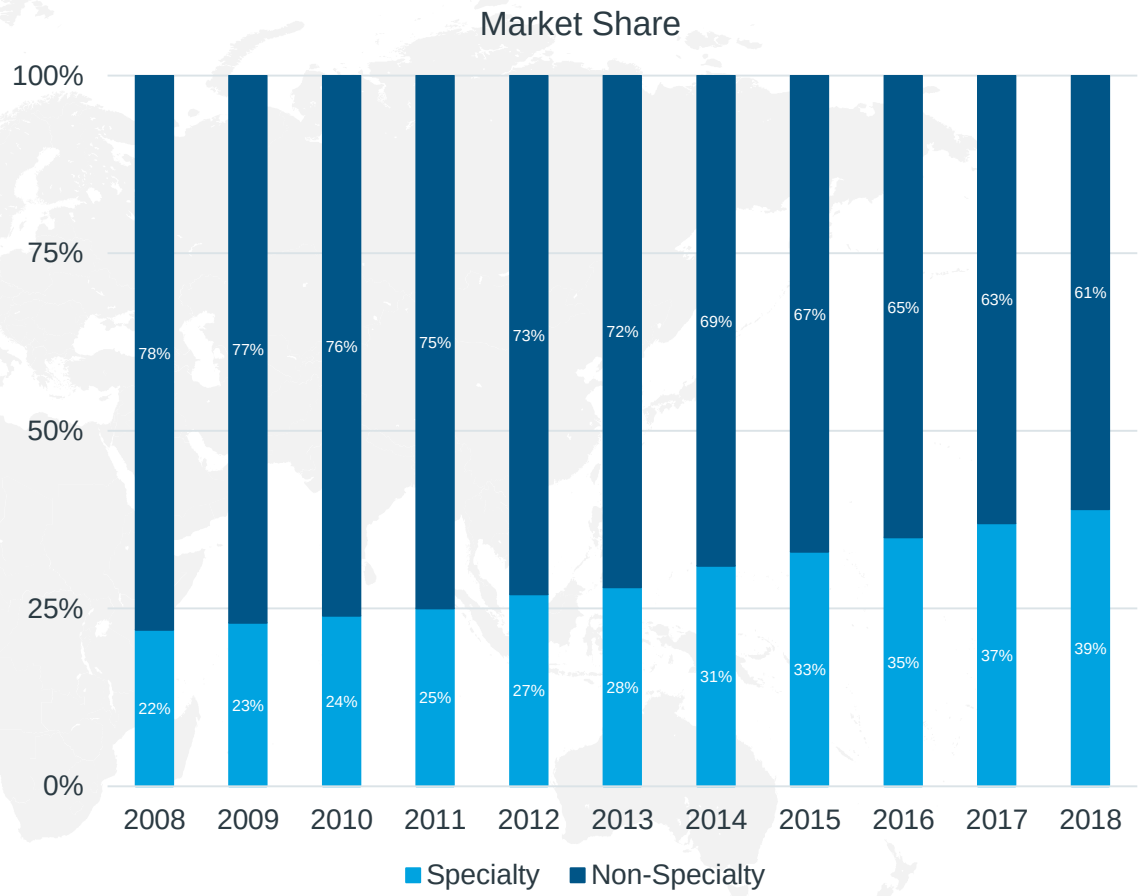
ATC 4th level definition of Specialty

Anti-TNF & more*	Hepatitis B & HIV	Oncology					Crohn's disease**	Others***		
L04B0	J05C1	L01A0	L01G2	L01H9	L02A2	V03C0	A07E0	A16A0	H01C2	L03B1
L04C	J05C2	L01B0	L01G3	L01J0	L02A3	V03D0	A07E1	B02C1	H01C3	L03B2
L04X0	J05C3	L01C1	L01G4	L01X1	L02A9		A07E2	B02C9	H02A1	L03B3
M01C0	J05C4	L01C2	L01G5	L01X2	L02B1		A07E9	B02D1	H04C0	L03B9
	J05C5	L01C3	L01G9	L01X3	L02B2			B02D2	H04E0	M05B3
	J05C9	L01C4	L01H1	L01X4	L02B3			B02D3	J06C0	M05B9
	J05D1	L01C9	L01H2	L01X5	L02B9			B03C0	J06E0	
	J05D2	L01D0	L01H3	L01X8	L03A1			G02X9	J06H4	
		L01F0	L01H4	L01X9	L03A9			G03G0	J06H9	
		L01G1	L01H5	L02A1	M05B4			H01C1	J06J0	

* Anti-TNF, specific anti-rheumatic agents and immunosuppressants
** not represented in this report
*** Acromegaly, Erythropoietins (Anemia), Gaucher's (Metabolic Disease), Growth hormones, Hemophilia, Immunoglobulins, Infertility, INJ CORTICOSTEROIDS PLN, Interferons (Hepatitis C, MS), Osteoporosis, Other Anticoagulants, Other Gynaecologicals, Parathyroid hormones

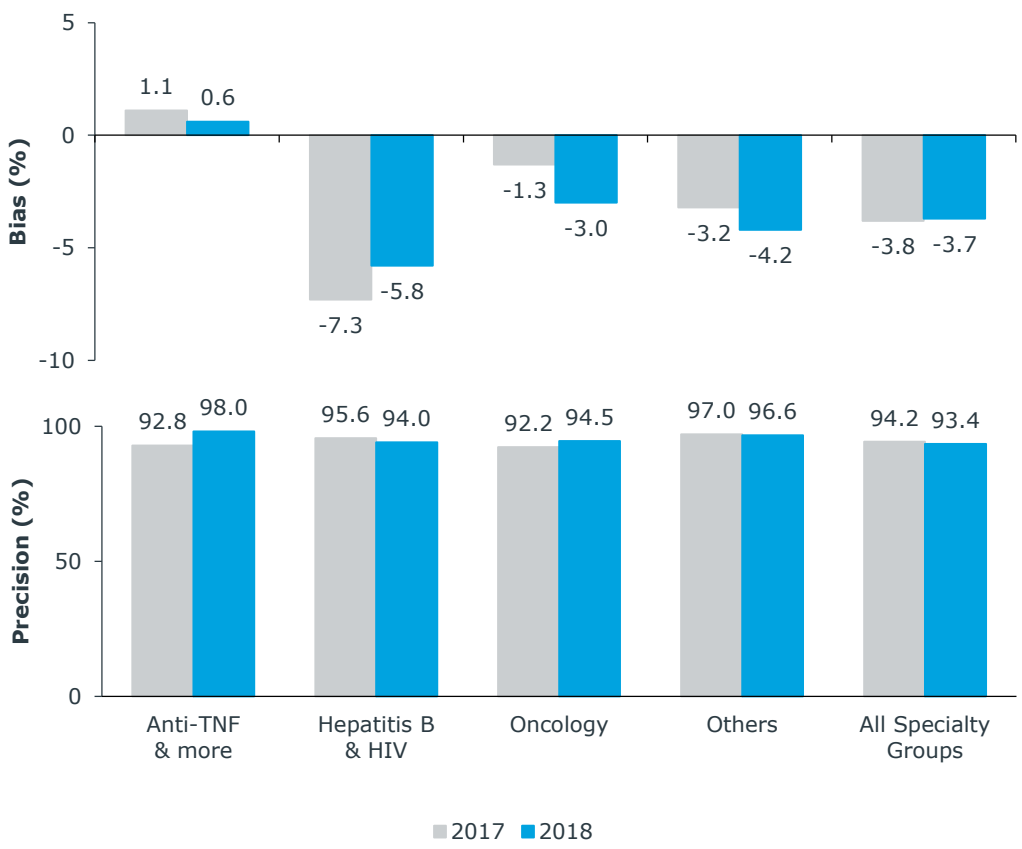
In 10 years Specialty grew 3X while Non-Specialty drugs grew 1.4X. Today Specialty is taking 39% of the entire pharma market.





Specialty market “Anti-TNF, specific anti-rheumatic agents and Immunosuppressants” show largest improvement*

Accuracy Results



Survey Basis

	Anti-TNF	Hep B & HIV	Oncology	Others	All Specialty Groups	
Countries surveyed	France Germany Hungary Japan Switzerland USA	France Germany Switzerland USA	Austria Croatia Czech Republic France Germany Greece Hungary Italy Japan Mexico Pakistan Poland Russia Slovakia South Africa Switzerland Turkey UAE USA	Argentina Austria C. America Czech R. Ecuador France Germany Hungary Italy Japan Mexico Pakistan Peru Russia Saudi Arabia Serbia South Africa South Korea Switzerland Turkey United Kingdom USA	Algeria Argentina Austria Bangladesh Bolivia Brazil Bulgaria C. America Chile China Croatia Czech R. Ecuador France Germany Greece Hungary Italy Japan Kazakhstan Lebanon Lithuania Mexico Pakistan	Paraguay Peru Philippines Poland Russia Saudi Arabia Serbia Slovakia Slovenia South Africa South Korea Switzerland Turkey UAE United Kingdom Uruguay USA
Specialty products surveyed	**410**	**130**	**1,375**	**1,147**	**4,261**	

*Due to low number of countries and products surveyed, the Accuracy results presented on this page require careful interpretation. A larger Specialty data base is planned for in the future.

IQVIA Market Prognosis

Content covered in this section

IQVIA Market Prognosis	1	What it is and what it is used for
Validity of Annual Forecast	2	Results by IQVIA's regional BU and leading 10 pharmaceutical markets
Commentary	3	Commentary on selected markets

IQVIA Market Prognosis

A strategic market forecasting publication that provides unparalleled country-level information on the pharmaceutical and healthcare industries.

Capabilities

- Based on a rigorous evaluation of key events affecting the marketplace, IQVIA Market Prognosis provides a robust five-year forecast at country, regional, and global levels.
- Customers can gain insights into the economic and political issues affecting the local pharmaceutical and healthcare industries such as cost containment, prescribing and reimbursement, pricing trends, and the regulatory environment.
- Forecasts are supported with detailed evaluation of the key issues affecting the market place.
- In-depth reports are available for 49 countries across 7 regions.
- Market Prognosis Global extends coverage, providing top-line country forecasts across 220 countries in 11 regions.

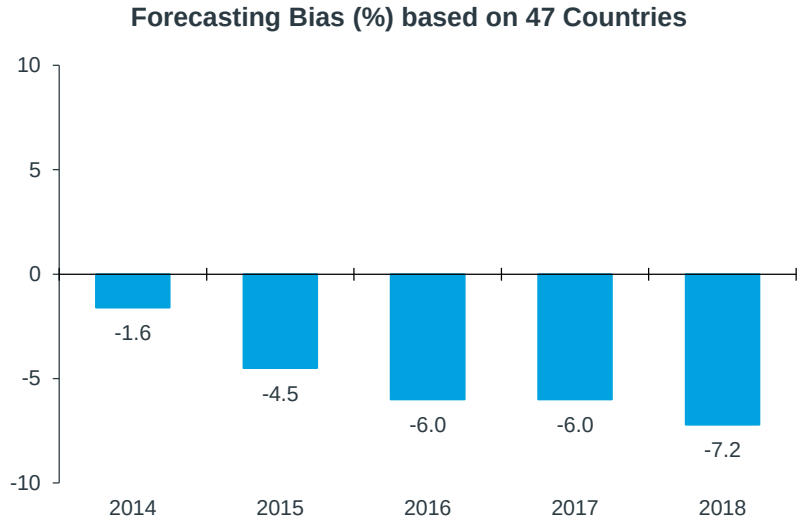
Use Cases

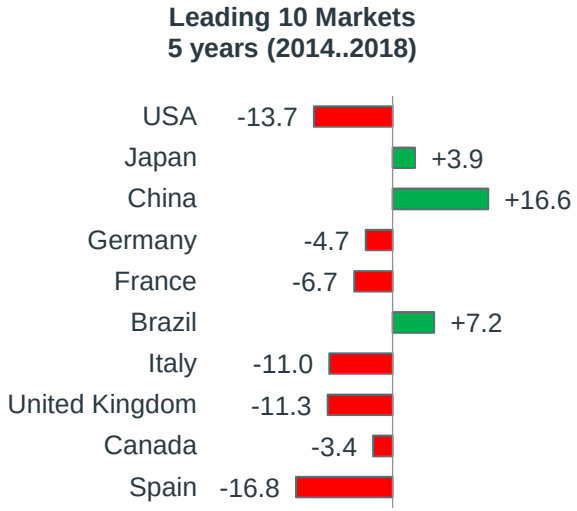
Customers can use IQVIA Market Prognosis to:

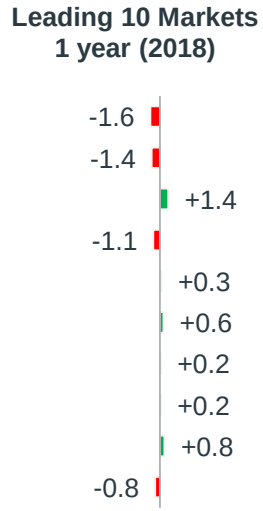
- Validate their forecasts to establish annual targets
- Set and manage expectations from corporate headquarters to local subsidiaries
- Evaluate key economic and healthcare related issues in each country
- Identify macro events shaping the pharmaceutical country markets
- Understand key drivers in the hospital and retail markets over the next five years for each country market
- Apply unrivalled world perspective on established and emerging markets to determine future investments

Market Prognosis

Validity of Annual Forecasts







Region	Average Bias (%) 2013..2017	2014..2018
AMESA		+1.2
Asia Pacific	+0.1	-0.5
Europe	-8.8	-9.9
Latin America	-2.6	-2.6
North America	-12.9	-8.6
All Regions	**-5.4**	**-5.1**

Market Prognosis on selected Markets

Commentary

United States

- The main issues for the underestimation of the US forecast in years 2-5 are as follows:
- There was sharper than expected price growth from 2014-2017 due to multiple factors. One being the price growth of expected products being stronger than anticipated due to delays in the Loss of Exclusivity of a number of products, for which generic entrants had been anticipated.
- Hepatitis C sector dynamics have also contributed to the underestimation, as these products outperformed forecast expectations, significantly driving market growth in 2014 and 2015, as well as acting as less of a drag than anticipated in 2016.
- Innovative new product sales outperformed expectations in 2014-2016.
- Some cost-containment measures and pricing policies were not implemented to the extent that was previously anticipated.

Japan

- The overestimation of the Japan market forecast, particularly in year 4 and 5 i.e. 2017-2018, is mainly due to more aggressive price regulation by the NHI than expected. Unforeseen out-of-cycle price cuts of certain expensive oncology drugs, such as Opdivo, contributed to a fall in average prices in the year 2017 compared with an forecast recovery commonly seen during the odd-numbered years,
- The unscheduled 2018 NHI price reform measures, which drastically revised the PMP (price maintenance premium) criteria and the LLP (long-listed products) pricing rules—resulted in steep decline in prices of several patented as well as off-patent originator brands in 2018.
- The growth trends especially in the hospital sector, were also impacted by the unpredicted entry of life-saving hepatitis C products Sovaldi (sofosbuvir) and Harvoni (sofosbuvir + ledipasvir), wherein the year 2015 witnessed a surge in sales at the time of launch of these drugs, while the year 2017 saw a sharp decline in their consumption.

China

- The high five-year variance for the forecast 2014-2018 is due to the fact that the Chinese market – which had been growing at a CAGR of 20% between 2008 and 2013 – slowed sharply into single digits in 2015, year 2 of the MP Q1 2014 forecast publication.
- While the forecast anticipated a deceleration, it was for a more gradual, on trend slowdown. This is also what most if not all observers, including the local experts, expected at the time.
- The sharper-than-expected slowdown in 2015 was due to increasingly stringent cost-containment measures and the implementation of reimbursement claim controls, which were being rolled out more widely by the health insurance authorities during the course of 2014, with a view to reducing overprescribing and cutting out waste in the system. These led to hospitals tightening up monitoring of rational use of medicines, with traditional Chinese medicines (TCM) and adjuvant drugs (among others) particularly affected.

Market Prognosis on selected Markets

Commentary

Italy

- The higher than expected growth in the Italian pharmaceutical market can be attributed to the following factors:
- Hepatitis C drugs outperforming forecast expectations and driving market growth in 2015 and 2016, and expansion in reimbursement criteria for new innovative HCV treatments sustaining this growth in the remainder of the forecast period.
- Other innovative new products also drove market growth in the last five years.
- Higher than expected growth in the DPC sector as all regional authorities adopted this model in the last five years.
- The retail sector, however, remains a prime target for cost-containment and witnessed a decline or stagnant growth in the last five years.

France

- As in other major markets, the forecast for France underestimated the impact of the launch of high-cost hepatitis C products on hospital sector growth.
- At year-end 2013, the last full year available when the Q1 2014 forecast was produced, France's hospital sector showed negative growth.
- Hospital sector growth shot up to close to 10% at year-end 2014, driven by high price growth, mainly as a result of the launch of Sovaldi (sofosbuvir) under a temporary use authorization (ATU) in 2014.
- The calculated new product launch impact for 2014-2018 significantly underestimated the price impact of this novel therapy.

United Kingdom

- The underestimation in the 5-year forecast published in Q1 2014 is due in part to the assumption at that time that the PPRS for 2014-2018 period would comprise price cuts similar to the previous scheme.
- The new PPRS did not, however, include price cuts but imposed annual caps on NHS expenditure on brand medicines with allowed growth rates of just under 2% in 2016-2018.
- In addition, the entry of premium priced new and specialty medicines, such as new hepatitis C drugs, led to higher than expected price growth over the forecast period.

Market Prognosis on selected Markets

Commentary

Germany

- The forecast published in Q1 2014 underestimated the five-year outlook in Germany largely due greater than expected use of higher priced innovative therapies which accelerated price/SU growth above the forecast at that time over the 5-year forecasting period.

Brazil

- The 5-year forecast overestimation was due to an unexpected economic recession and change in the political landscape. Following years of expansionary populist healthcare programs and high levels of public spending (which continued into 2014), finances were stretched, and cost-containment measures started to increase.
- The deteriorating economy, and rising inflation, affected consumer confidence and disposable incomes, further impacting retail sales. Although, the government's popularity had started to decline, the EIU and polls predicted its re-election in 2014. Market Prognosis forecasts, though more cautious, at the time assumed a continuation of healthcare policies.
- Brazil entered an unexpected recession in 2015-2016 and witnessed an unpredicted presidential impeachment, which led to the formation of a new centrist government at the end of 2016. The new government intensified cost-containment, cut healthcare budgets and reduced funding for healthcare programs.
- CMED tightened controls by setting maximum price increases below inflation, further affecting pharmaceutical value sales.

Spain

- The 5-year forecast underestimation of market value for 2014-2018, reflected the fact that Spain was emerging from a deep recession.
- Pharmaceutical sales growth was expected to be restricted by the harsh austerity measures, which were expected to remain in place over the forecast period.
- Market Prognosis forecasts remained conservative. However, a better than expected economic recovery was recorded during 2015-2017.
- Additionally, better than expected pharmaceutical sales growth was observed during this period, especially at hospital level, mostly driven in 2015 by high expenditure on hepatitis C virus (HCV) treatments (though this was a short-term boost, as sales started to slow down in 2016, as new competitors entered the market and as HCV drug prices fell).
- Likewise, growth recovered in 2016, due mainly to lack of control on expenditure resulting from an unforeseen political gridlock starting late 2015 and 2016. Provisions in the Royal Decrees introduced in 2015, to further cut spending, have been on hold ever since.

Appendix

Accuracy: Country/Channel Results

Validated Countries / Regions by Channel

(please use hyperlinks for navigation)

Retail (Sell-in)

+ Algeria
+ Argentina
+ Austria
+ Bangladesh
+ Brazil
+ Bulgaria
+ Canada
+ Central America
+ Chile
+ Colombia
+ Croatia
+ Dominican Republic
+ Ecuador
+ Egypt
+ Estonia
+ Germany
+ Hong Kong
+ Italy

Retail (Sell-in)

+ Jordan
+ Kuwait
+ Latvia
+ Lebanon
+ Lithuania
+ Mexico
+ Morocco
+ Pakistan
+ Peru
+ Philippines
+ Saudi Arabia
+ Singapore
+ South Korea
+ South Africa
+ Thailand
+ Tunisia
+ Turkey
+ United A. Emirates

Hospital (Sell-in)

+ Austria
+ Canada
+ China
+ Philippines
+ South Korea

Combined (Sell-in)

+ Bosnia
+ Czech Republic
+ Hungary
+ Japan
+ Kazakhstan
+ Poland
+ Russia
+ Serbia
+ Slovakia
+ Slovenia
+ Switzerland
+ USA

Retail OTC (Sell-in)

+ Argentina
+ Brazil
+ Bulgaria
+ Canada
+ Mexico
+ South Africa
+ South Korea

Retail OTC (Sell-out)

+ Austria
+ Czech Republic
+ Germany
+ Greece
+ Hungary
+ Italy
+ Poland
+ Slovakia
+ Switzerland

Other (Sell-out)

Retail

+ France
+ Germany
+ Greece
+ United Kingdom

PharmaTrend

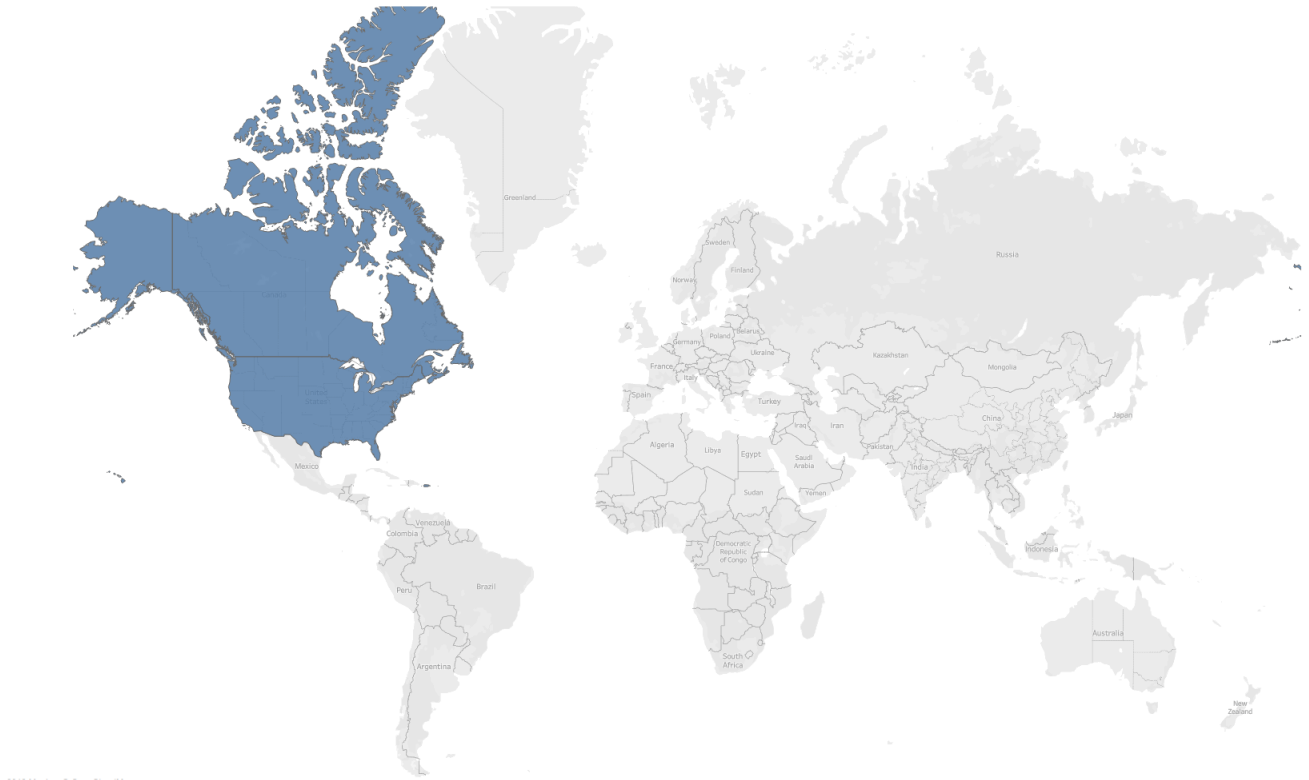
+ Austria
+ Croatia
+ Czech Republic
+ Finland
+ Germany
+ Hungary
+ Italy
+ Poland
+ Slovakia
+ Switzerland

Hospital

+ Germany
+ Italy
+ United Kingdom

Back

United States of America + Canada



Countries
United States of America
Canada

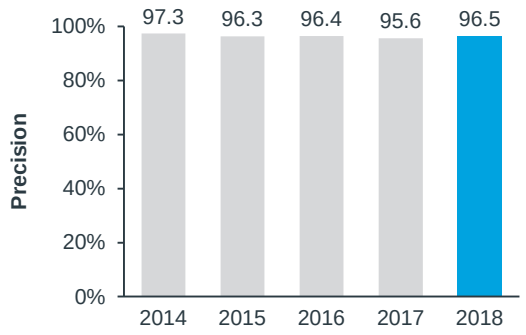
Back

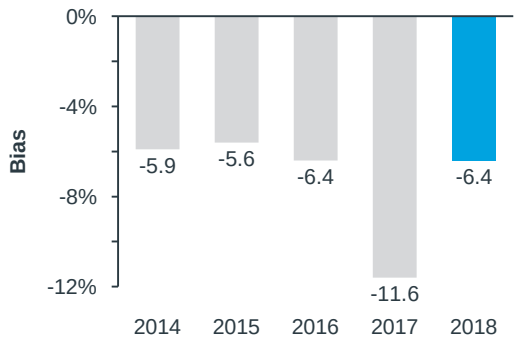
USA Retail + Non-Retail Validation Study

2018 Validation Study

Validation Results

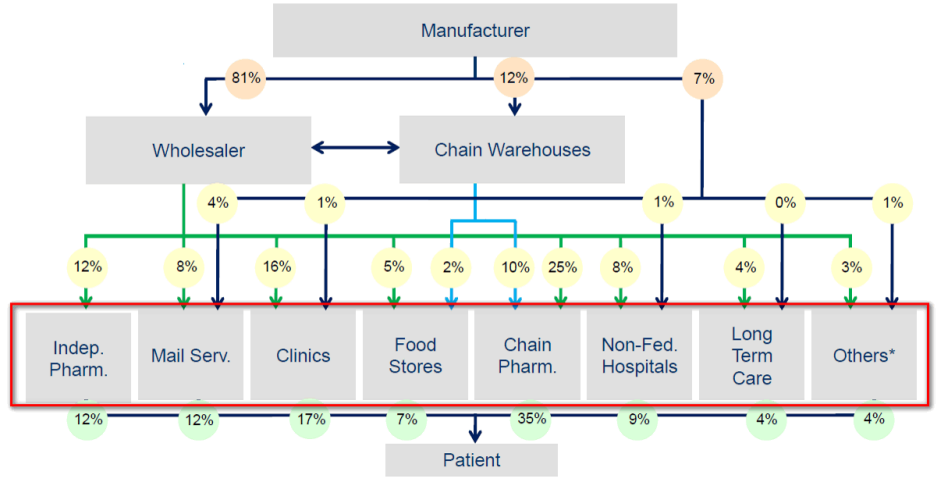
Precision	96.5%	Bias	-6.4%





Outcomes	Negative bias is expected due to supplier blocking of sales including federal government accounts and manufacturer-requested products and facilities.

Distribution Channels Validated



* HMO, Home Health Care, Fed. Hospitals, Misc.

Updated in 2018 based on 2017 annual sales

Participation

# Participating Companies	# Forms Validated	% Market Validated
73 *(+20)*	**1,384** *(+507)*	**86%** *(+13%p)*

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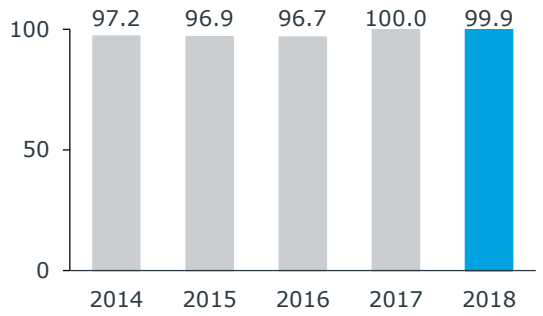
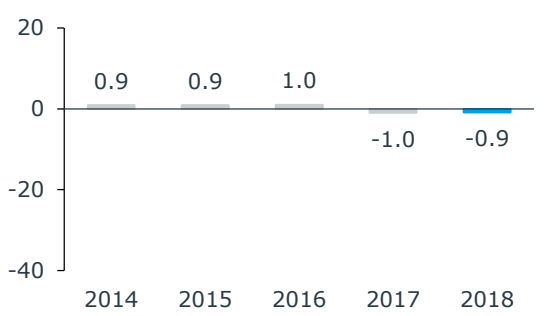
Canada Retail Validation Study

2018 Validation Study

Validation Results

Precision	99.9%	Bias	-0.9%

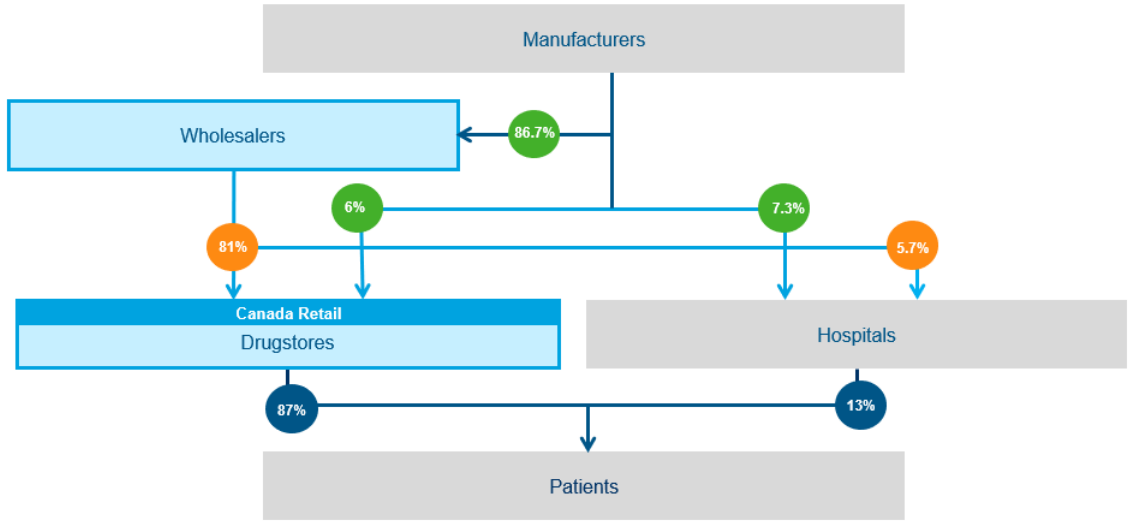




Outcomes

- Overall precision index declined by 0.1 percentage points in 2018
- Overall underestimation improved by 0.1 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
259 *(+9 vPY)*	**6,407** *(-144 vPY)*	**95%** *(no change vPY)*

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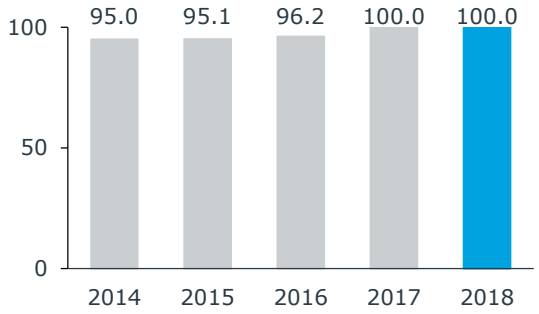
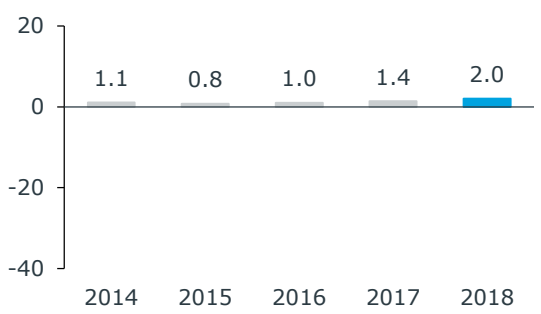
Canada OTC Validation Study

2018 Validation Study

Validation Results

Precision	100%	Bias	2.0%

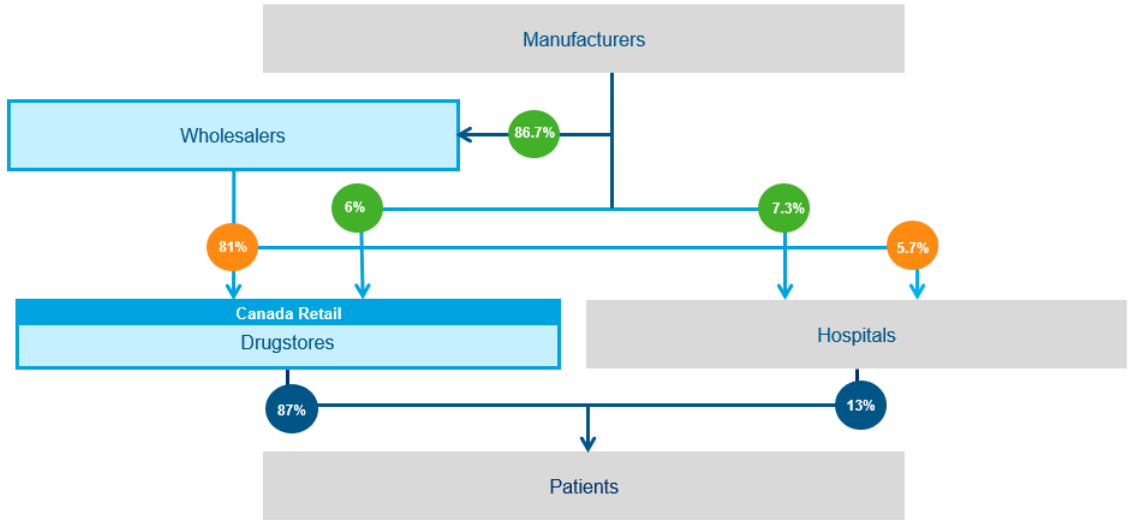




Outcomes

- Overall precision index remained unchanged at 100% in 2018
- Overall underestimation increased by 0.6 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
167 *(+3 vPY)*	**3,127** *(-58 vPY)*	**95%** *(no change vPY)*

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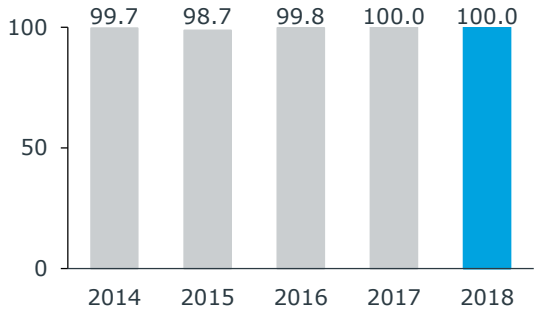
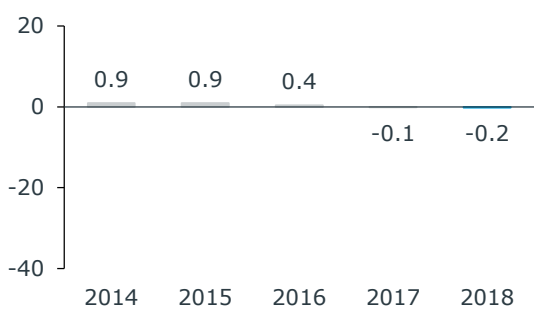
Canada Hospital Validation Study

2018 Validation Study

Validation Results

Precision	100%	Bias	-0.2%

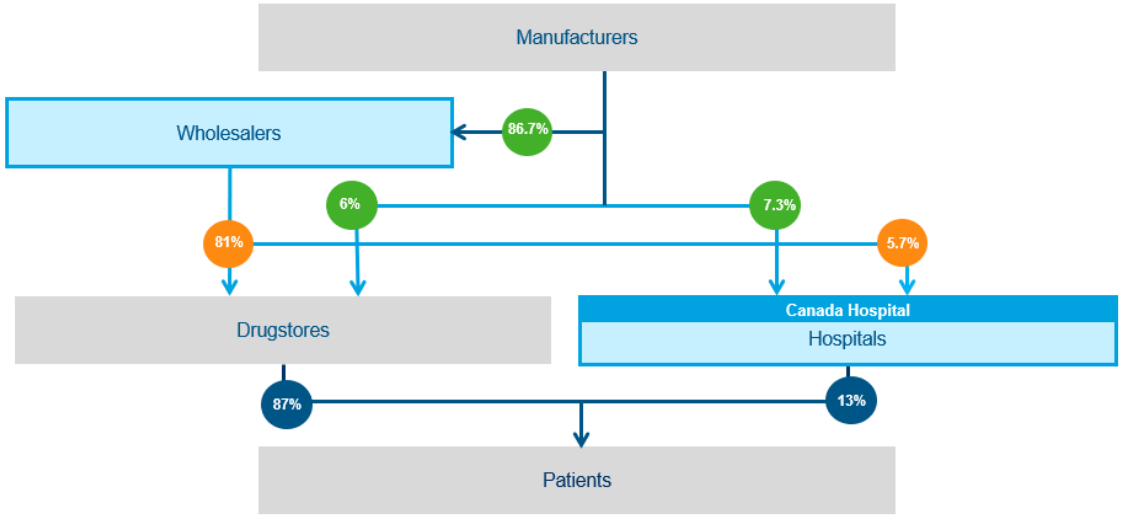




Outcomes

- Overall precision index remained unchanged in 2018
- Overall underestimation increased by 0.1 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
110 *(-5 vPY)*	**1,224** *(-36 vPY)*	**95%** *(no change vPY)*

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Latin America

Countries	
Argentina	Ecuador
Bolivia	Mexico
Brazil	Paraguay
Central America	Peru
• Guatemala	Uruguay
• El Salvador	Venezuela
• Honduras	
• Nicaragua	
• Costa Rica	
• Panama	
Chile	
Colombia	
Dominican Republic	

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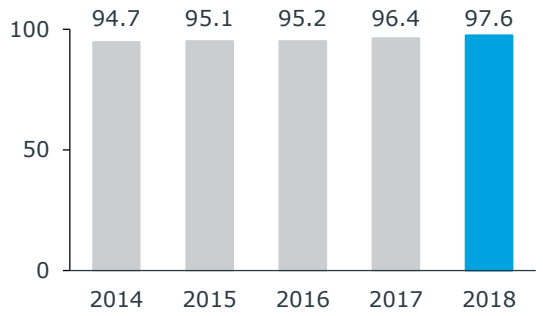
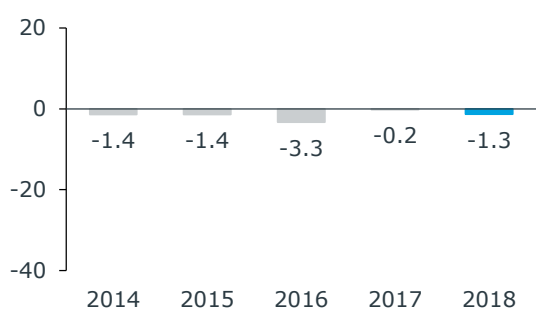
Argentina Retail Validation Study

2018 Validation Study

Validation Results

Precision	97.6%	Bias	-1.3%

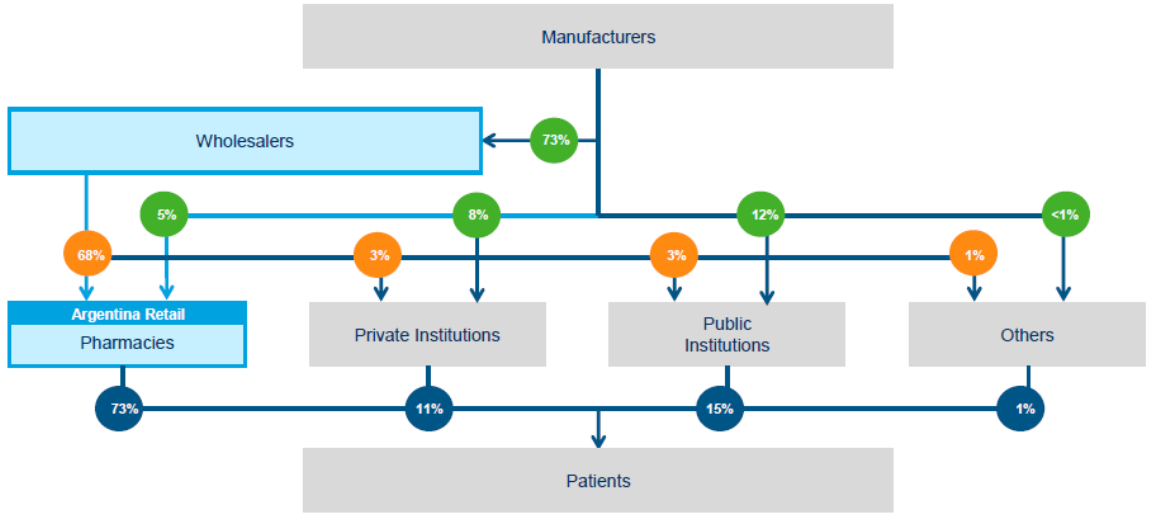




Outcomes

- Overall precision index improved by 1.2 percentage points in 2018
- Overall underestimation increased by 1.1 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
37 *(-3 vPY)*	**2,106** *(-96 vPY)*	**45%** *(-3% vPY)*

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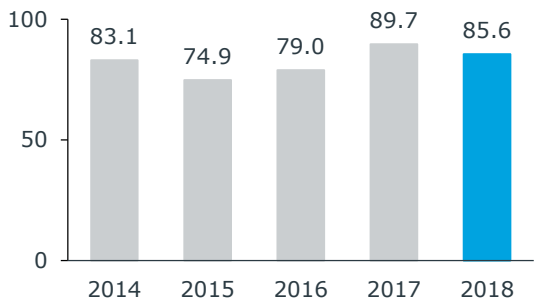
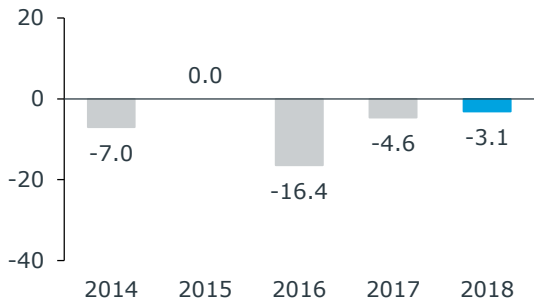
Argentina OTC Validation Study

2018 Validation Study

Validation Results

Precision	85.6%	Bias	-3.1%

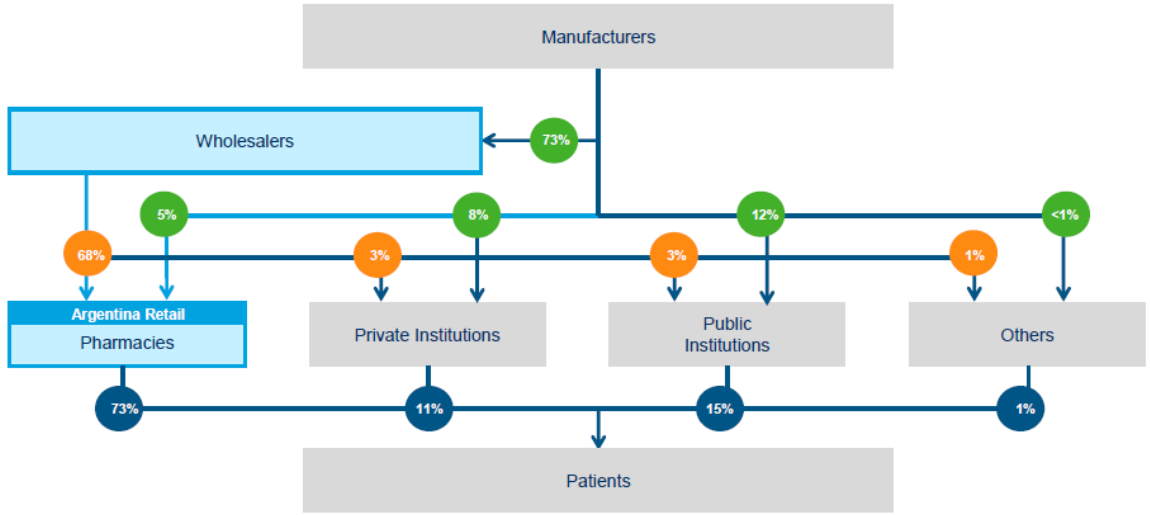




Outcomes

- Overall precision index declined by 4.1 percentage points in 2018
- Overall underestimation improved by 1.5 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
23 *(-2 vPY)*	**210** *(-5 vPY)*	**18%** *(-3% vPY)*

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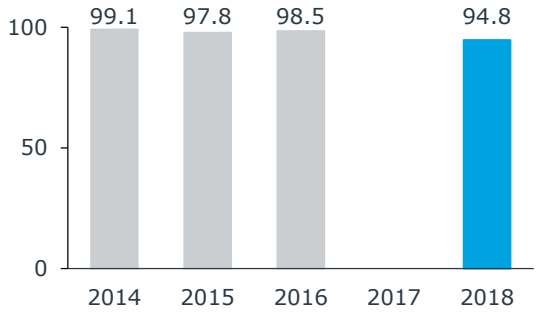
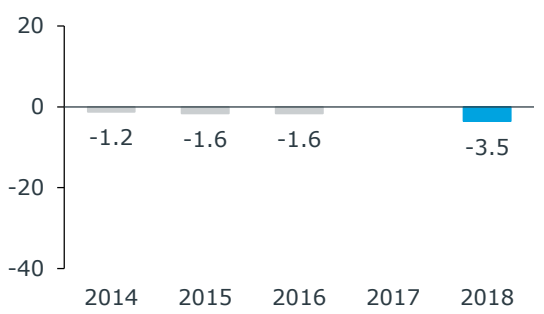
Brazil Retail Validation Study

2018 Validation Study

Validation Results

Precision	94.8%	Bias	-3.5%

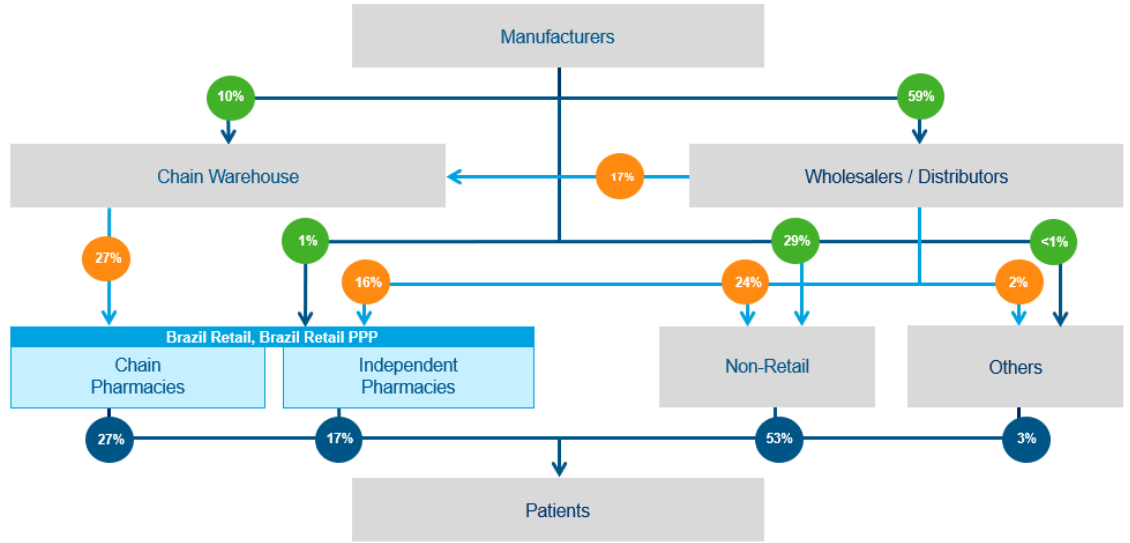




Outcomes

- Overall precision index declined by 3.7 percentage points in 2018
- Overall underestimation increased by 1.9 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
22 *(+1 v2016)*	**647** *(-177 v2016)*	**10%** *(-4% v2016)*

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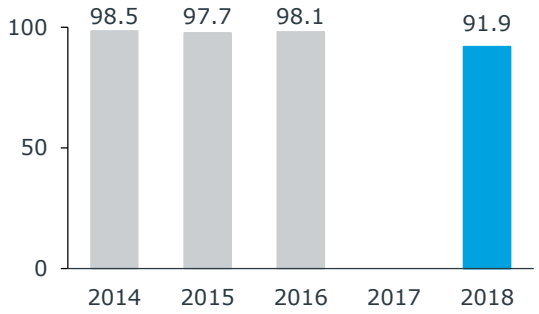
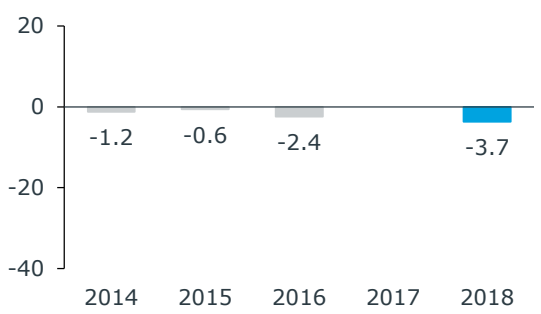
Brazil OTC Validation Study

2018 Validation Study

Validation Results

Precision	91.9%	Bias	-3.7%

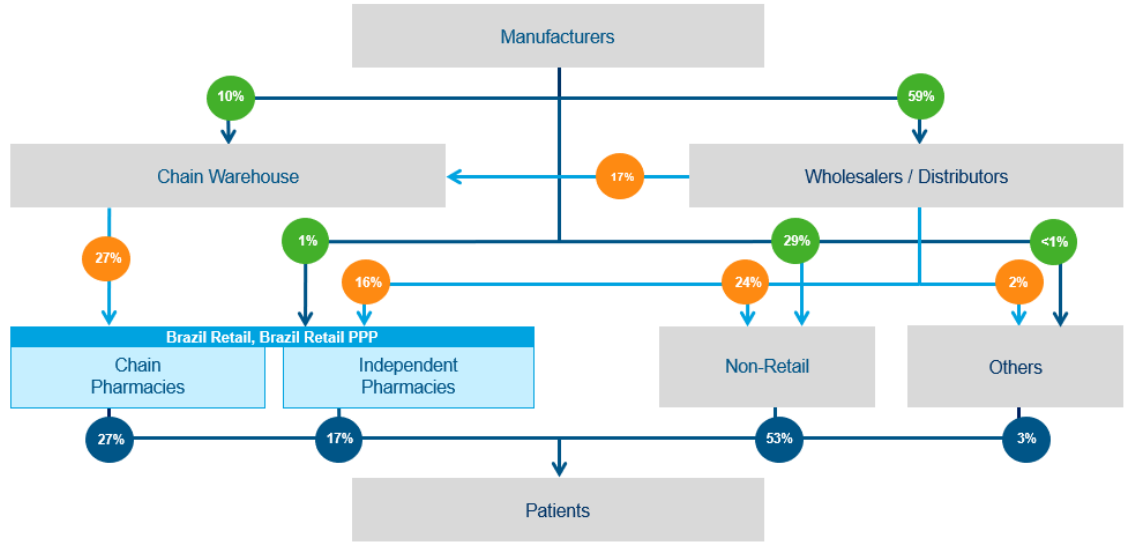




Outcomes

- Overall precision index declined by 6.2 percentage points in 2018
- Overall underestimation increased by 1.3 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
17 *(+2 v2016)*	**170** *(-14 v2016)*	**11%** *(-2% v2016)*

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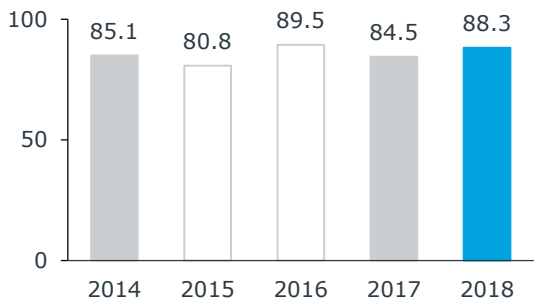
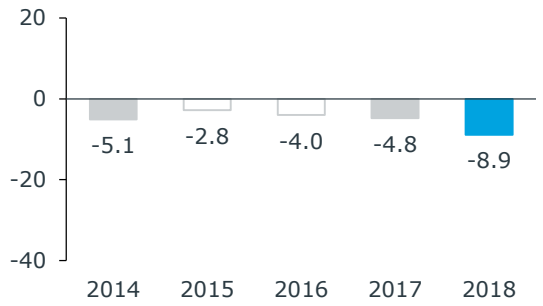
Central America Retail Validation Study

2018 Validation Study

Validation Results

Precision	88.3%	Bias	-8.9%

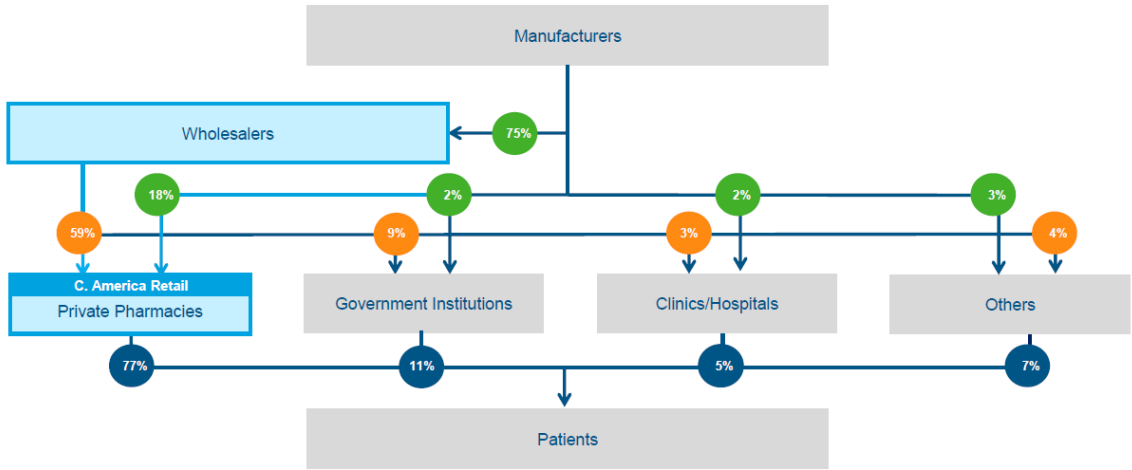




Outcomes

- Overall precision index improved by 3.8 percentage points in 2018
- Overall underestimation increased by 4.1 percentage points in 2018
- Review projection level and update channel study are required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
23 *(-2 vPY)*	**1,419** *(-8 vPY)*	**24%** *(-2% vPY)*

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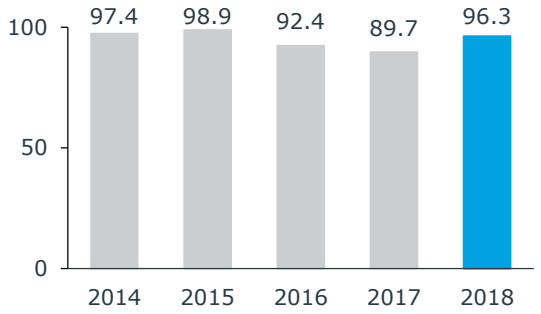
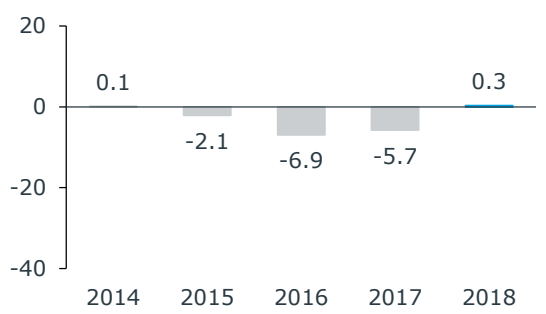
Chile Retail Validation Study

2018 Validation Study

Validation Results

Precision	96.3%	Bias	0.3%

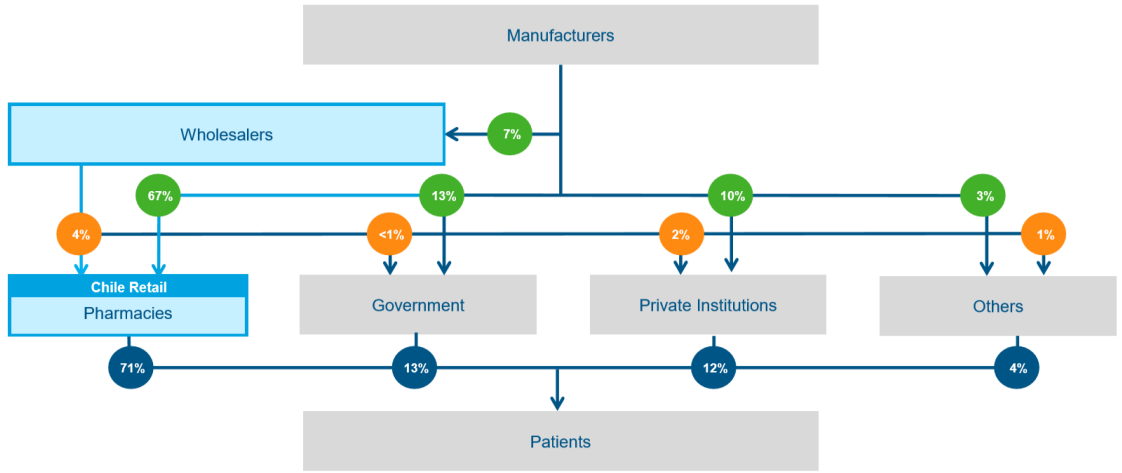




Outcomes

- Overall precision index improved by 6.6 percentage points in 2018
- Overall bias turned from 5.7% underestimation to 0.3% overestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
11 *(-1 vPY)*	**579** *(+113 vPY)*	**12%** *(-5% vPY)*

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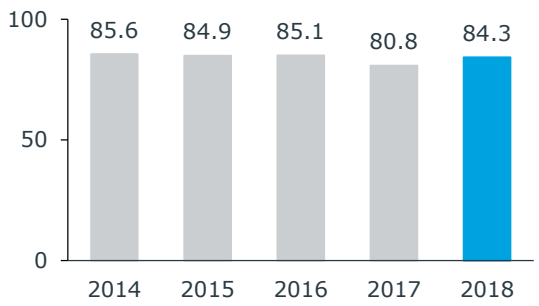
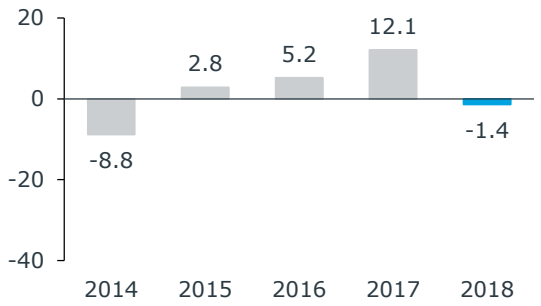
Colombia Retail Validation Study

2018 Validation Study

Validation Results

Precision	84.3%	Bias	-1.4%

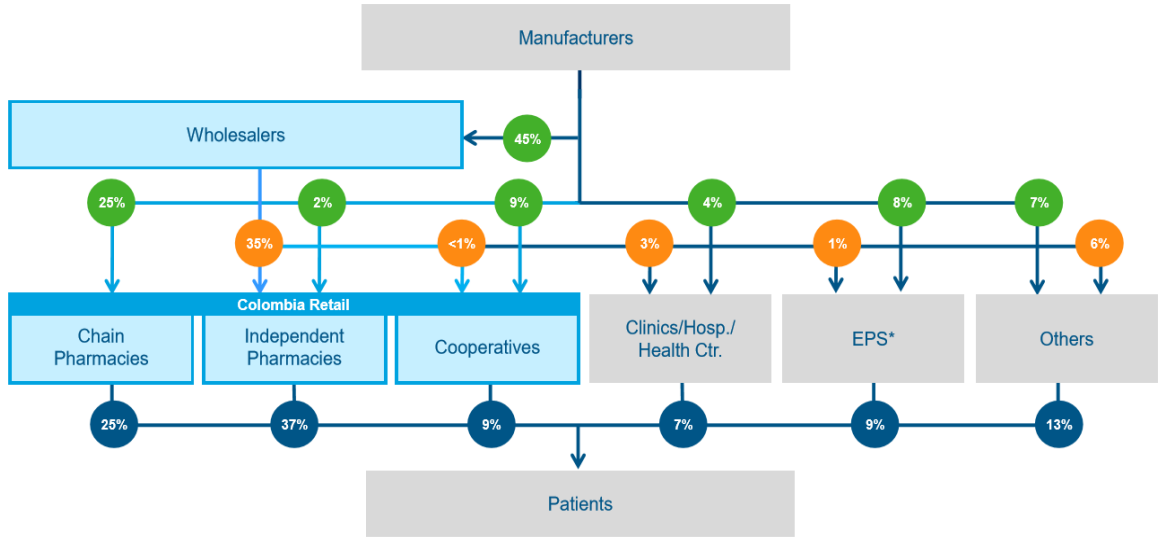




Outcomes

- Overall precision index improved by 3.5 percentage points in 2018
- Overall bias turned from 12.1% overestimation in 2017 to 1.4% underestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

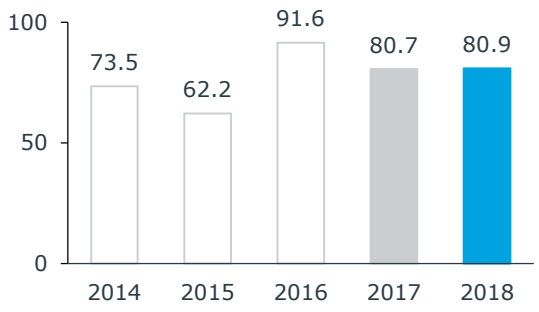
# Participating Companies	# Forms Validated	% Market Validated
13 *(-5 vPY)*	**871** *(+100 vPY)*	**18%** *(no change)*

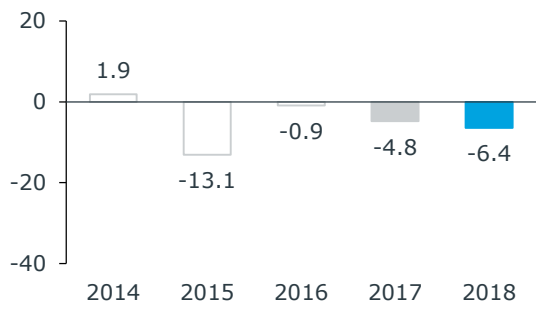
Dominican Republic Retail Validation Study

2018 Validation Study

Validation Results

Precision	80.9%	Bias	-6.4%

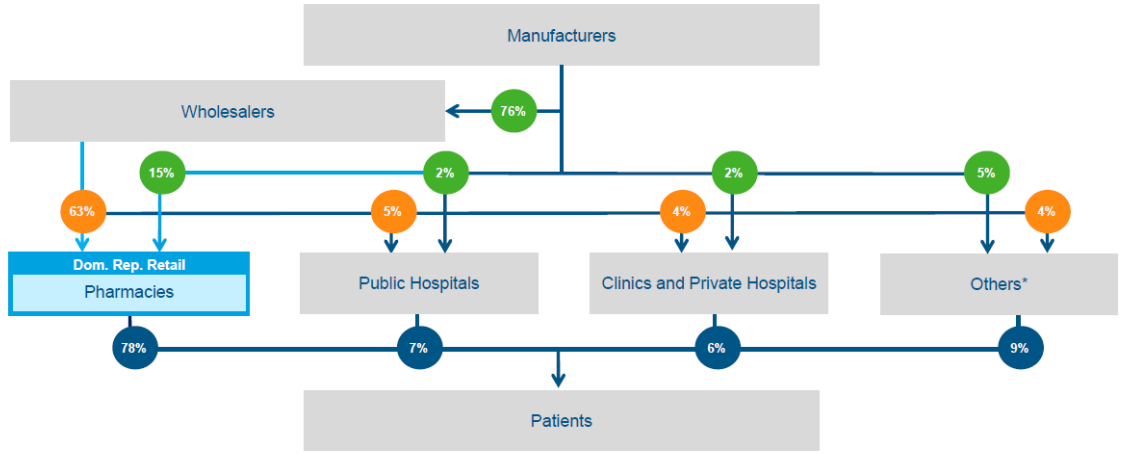




Outcomes

- Overall precision index improved by 0.2 percentage points in 2018
- Overall underestimation increased by 1.6 percentage points in 2018
- Fulfill sample design and review internal processes are required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(-4 vPY)*	**1,061** *(-129 vPY)*	**16%** *(-7% vPY)*

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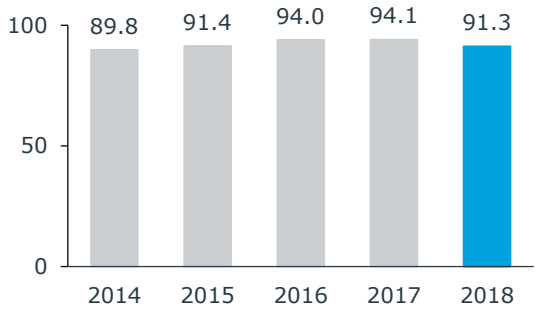
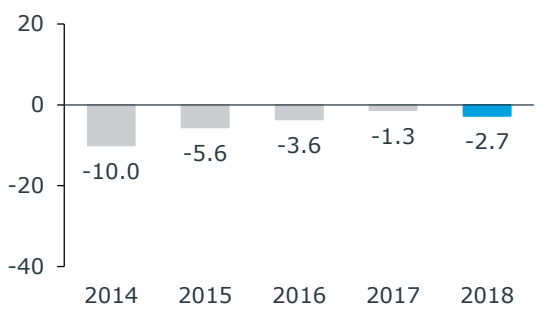
Ecuador Retail Validation Study

2018 Validation Study

Validation Results

Precision	91.3%	Bias	-2.7%

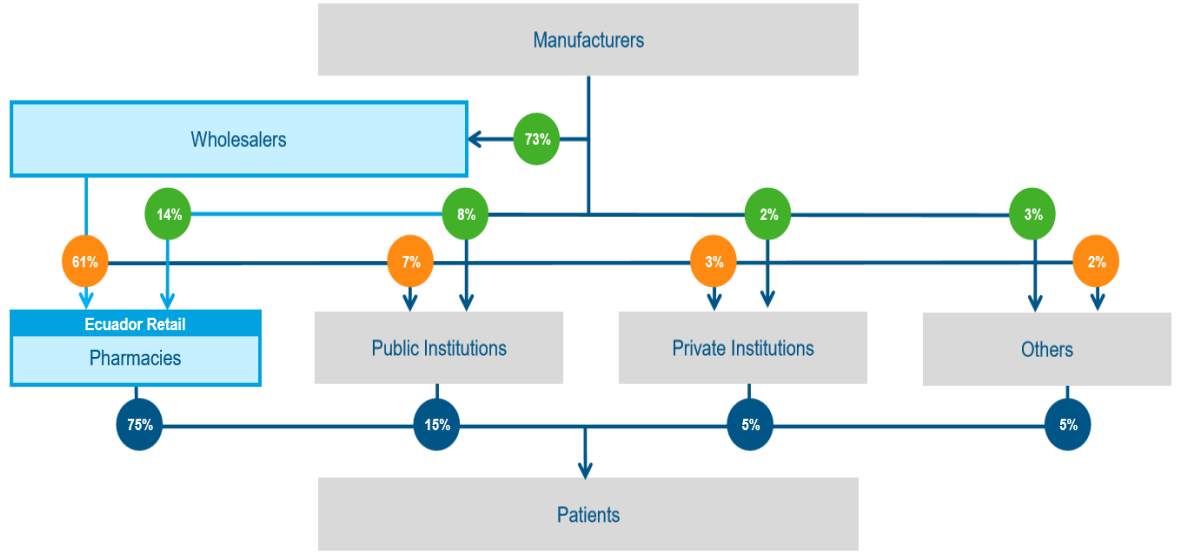




Outcomes

- Overall precision index declined by 2.8 percentage points in 2018
- Overall underestimation increased by 1.4 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
63 *(+24 vPY)*	**1,835** *(+501 vPY)*	**54%** *(+16 vPY)*

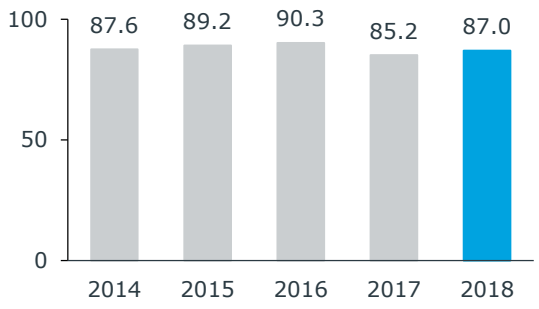
Back

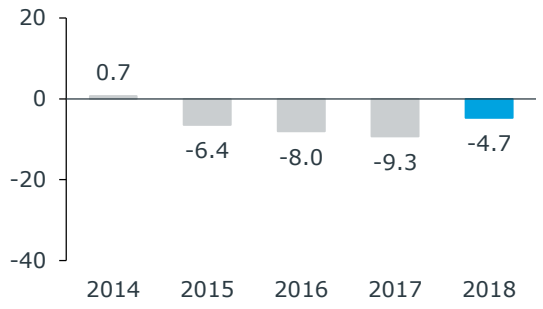
Mexico Retail Validation Study

2018 Validation Study

Validation Results

Precision	87.0%	Bias	-4.7%

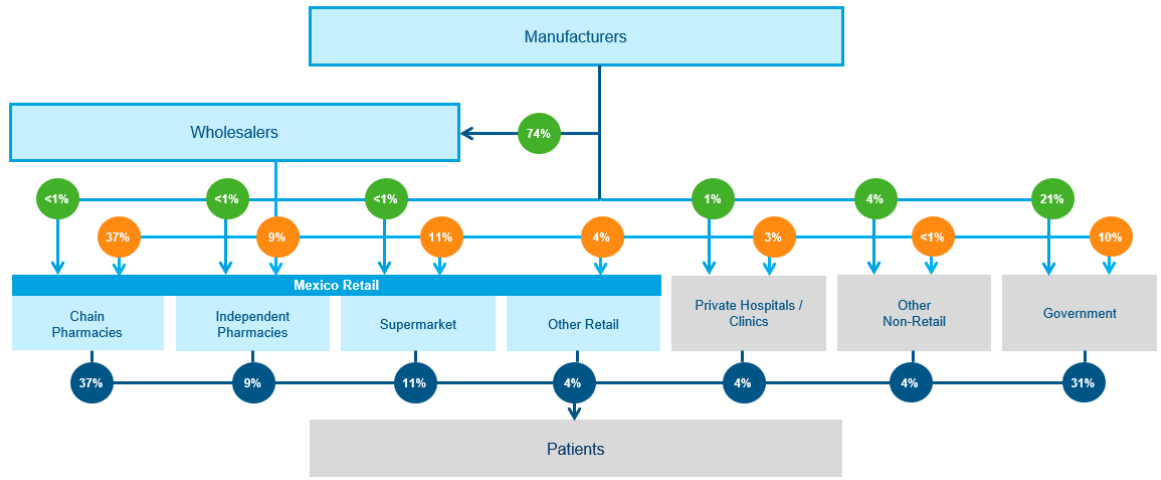




Outcomes

- Overall precision index improved by 1.8 percentage points in 2018
- Overall underestimation improved by 4.6 percentage points in 2018
- To review projection methodology and increase direct sales panel are required from a statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
23 *(-8 vPY)*	**996** *(-2 vPY)*	**13%** *(-2% vPY)*

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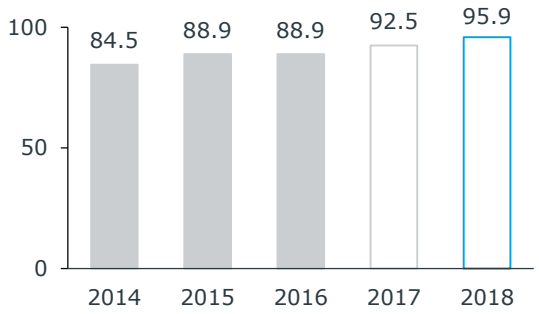
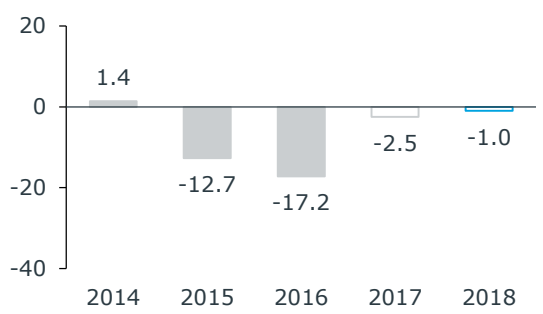
Mexico OTC Validation Study

2018 Validation Study

Validation Results

Precision	95.9%	Bias	-1.0%

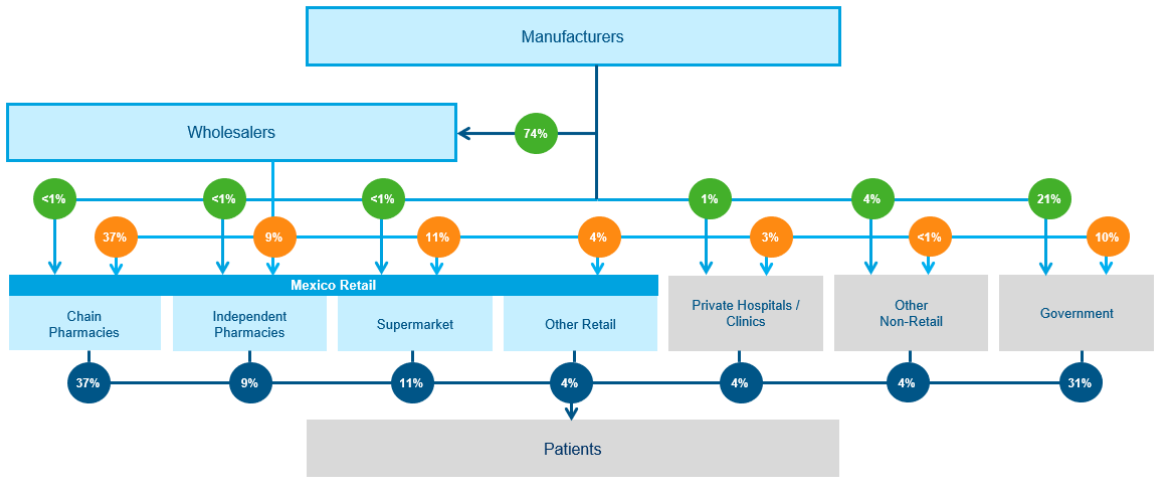




Outcomes

- Overall precision index improved by 3.4 percentage points in 2018
- Overall underestimation improved by 1.5 percentage points in 2018
- To review projection methodology and increase direct sales panel are required from a statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
6 *(-2 vPY)*	**124** *(-8 vPY)*	**8%** *(no change vPY)*

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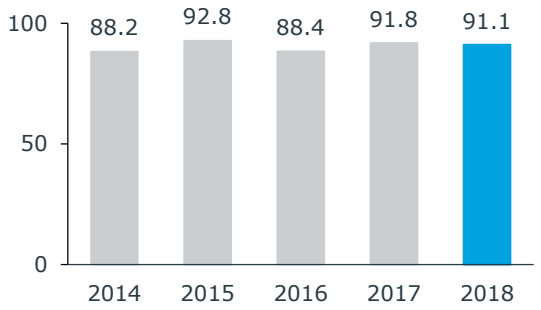
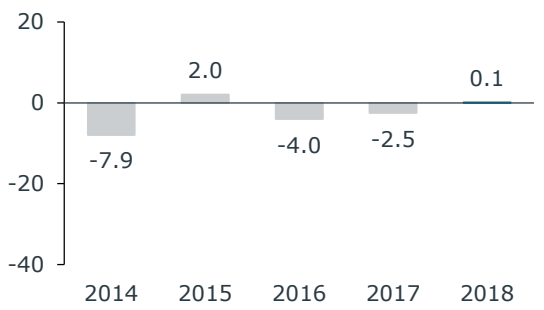
Peru Retail Validation Study

2018 Validation Study

Validation Results

Precision	91.1%	Bias	0.1%

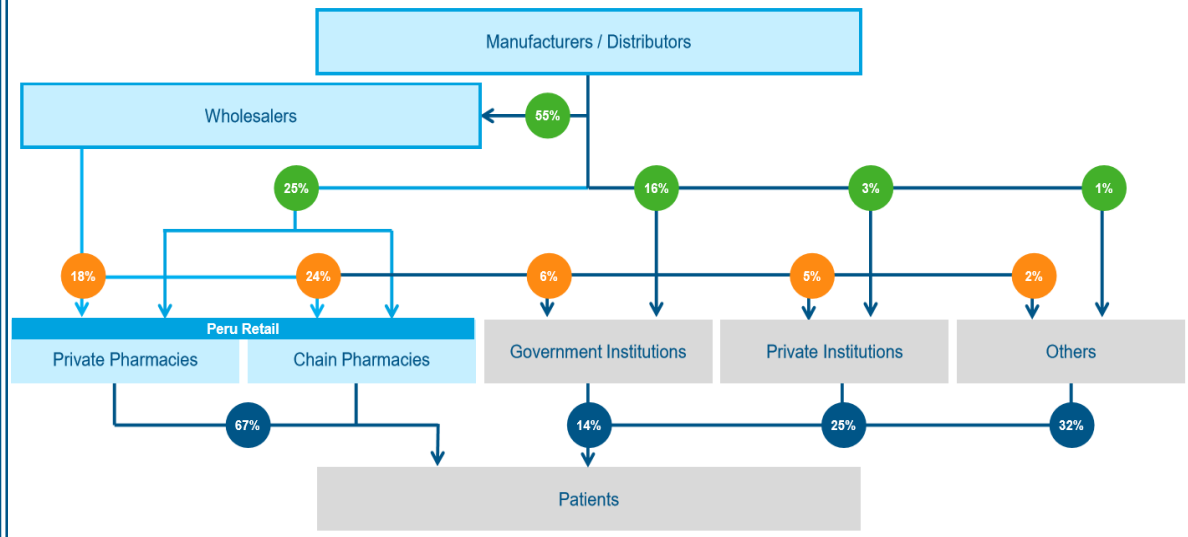




Outcomes

- Overall precision index declined by 0.7 percentage points in 2018
- Overall bias turned from 2.5% underestimation in 2017 to 0.1% overestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(+9 vPY)*	**1,151** *(+787 vPY)*	**39%** *(+12 vPY)*

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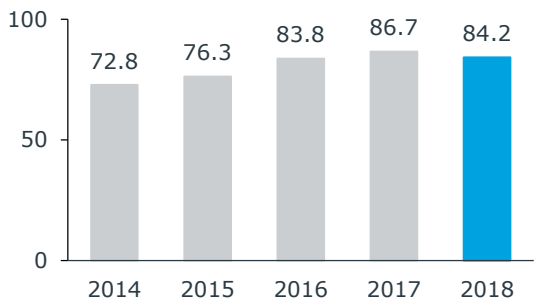
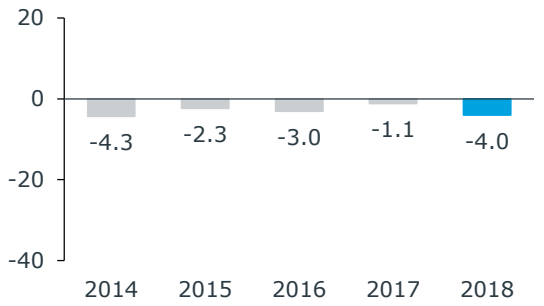
Uruguay Retail+Mutuales Validation Study

2018 Validation Study

Validation Results

Precision	84.2%	Bias	-4.0%

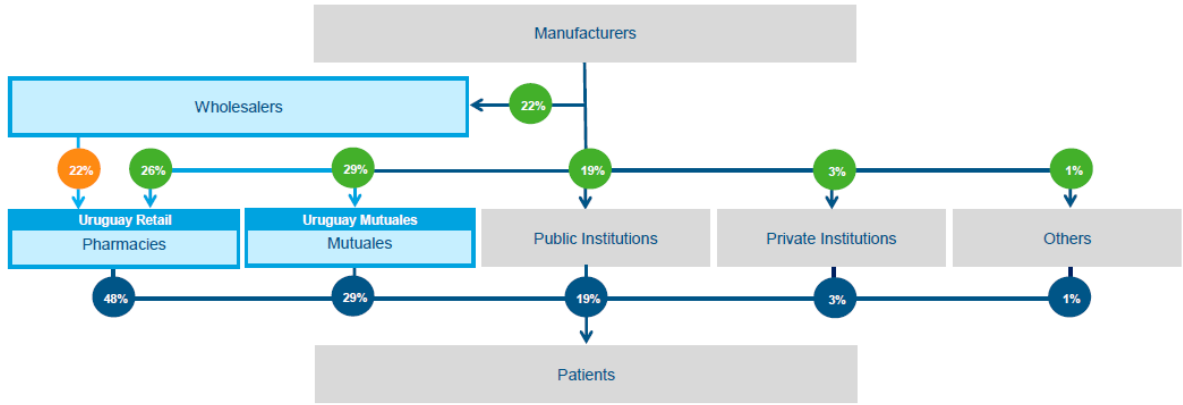




Outcomes

- Overall precision index declined by 2.5 percentage points in 2018
- Overall underestimation increased by 2.9 percentage points in 2018
- To review internal processes and fulfill sample design are required from a statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
13 *(+6 vPY)*	**716** *(+93 vPY)*	**43%** *(+5% vPY)*

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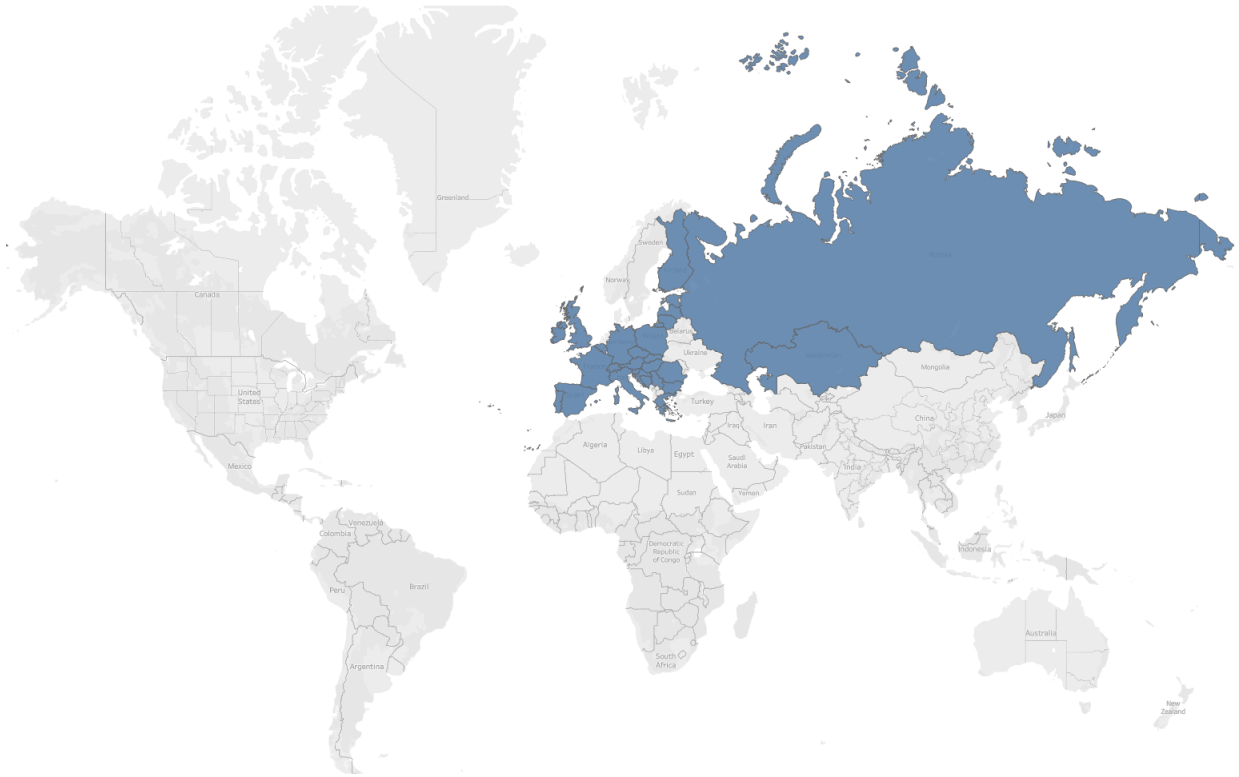
Europe



Countries	
Austria	Kazakhstan
Belgium	Latvia
Bosnia	Lithuania
Bulgaria	Poland
Croatia	Portugal
Czech Republic	Romania
Estonia	Russia
Finland	Serbia
France	Slovakia
Germany	Slovenia
Greece	Spain
Hungary	Switzerland
Ireland	United Kingdom
Italy	

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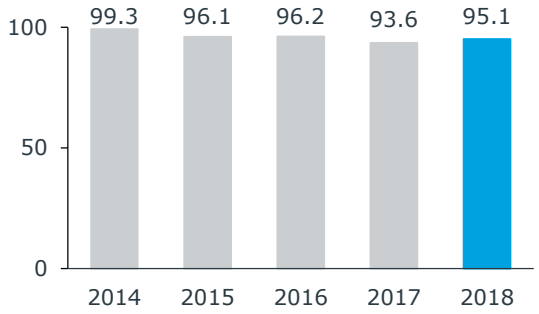
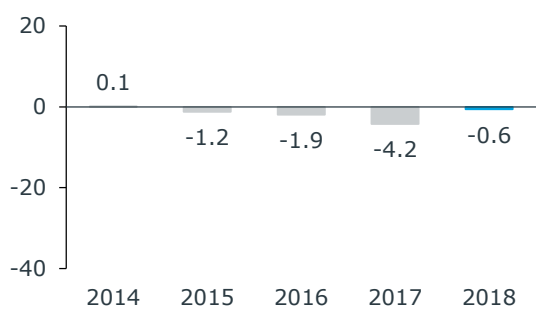
Austria Retail Validation Study

2018 Validation Study

Validation Results

Precision	95.1%	Bias	-0.6%

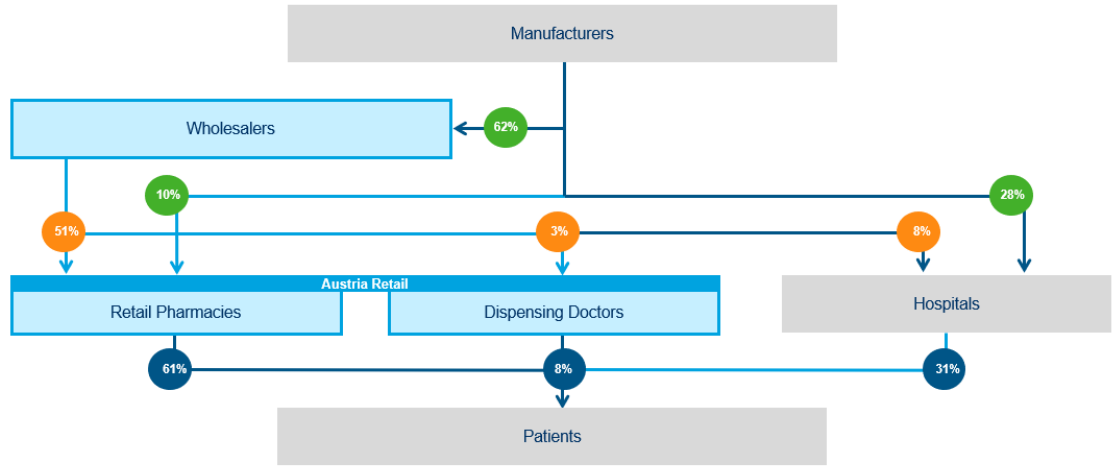




Outcomes

- Overall precision index improved by 1.5 percentage points in 2018
- Overall underestimation improved by 3.6 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(+6 vPY)*	**796** *(+392 vPY)*	**25%** *(+13% vPY)*

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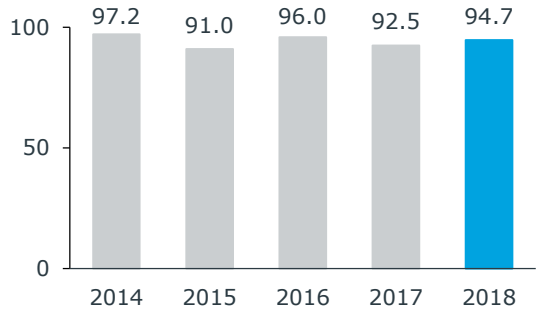
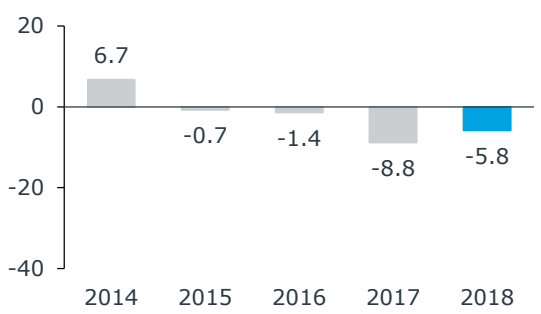
Austria OTC Validation Study

2018 Validation Study

Validation Results

Precision	94.7%	Bias	-5.8%

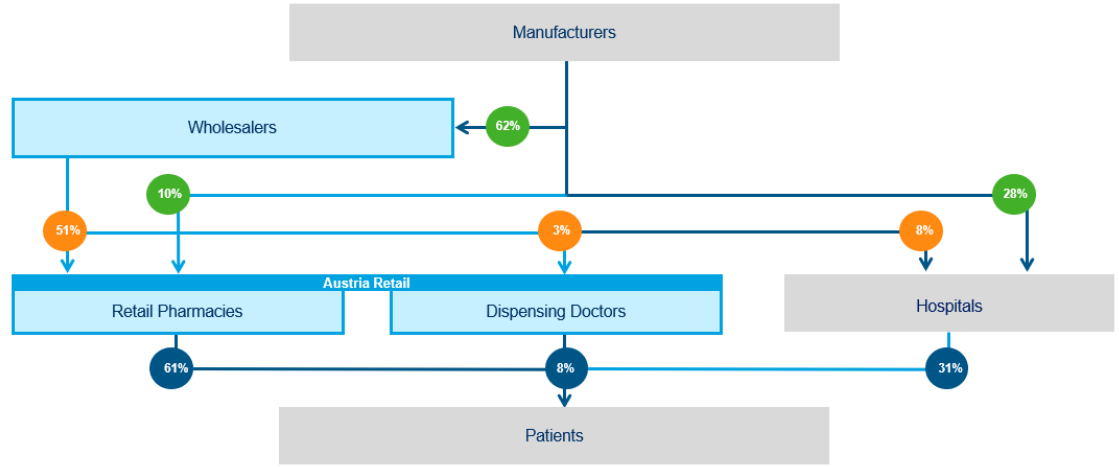




Outcomes

- Overall precision index improved by 2.2 percentage points in 2018
- Overall underestimation improved by 3.0 percentage points in 2018
- To increase panel size for expanding offering granularity to further improve precision.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
9 *(+3 vPY)*	**128** *(+75 vPY)*	**28%** *(+16% vPY)*

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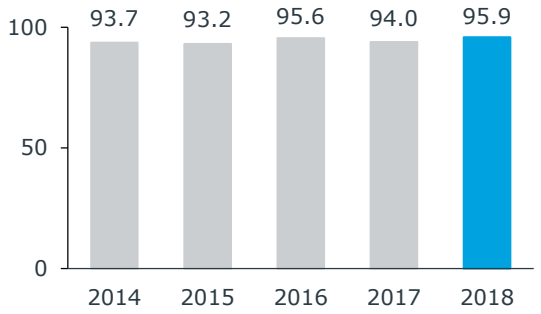
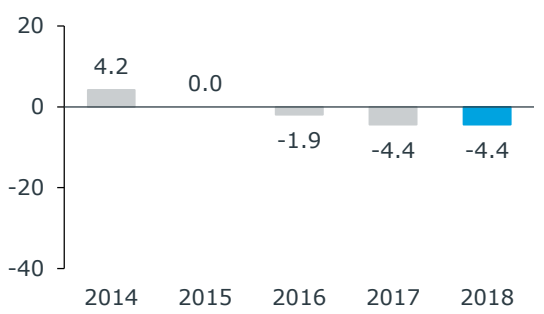
Austria PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	95.9%	Bias	-4.4%

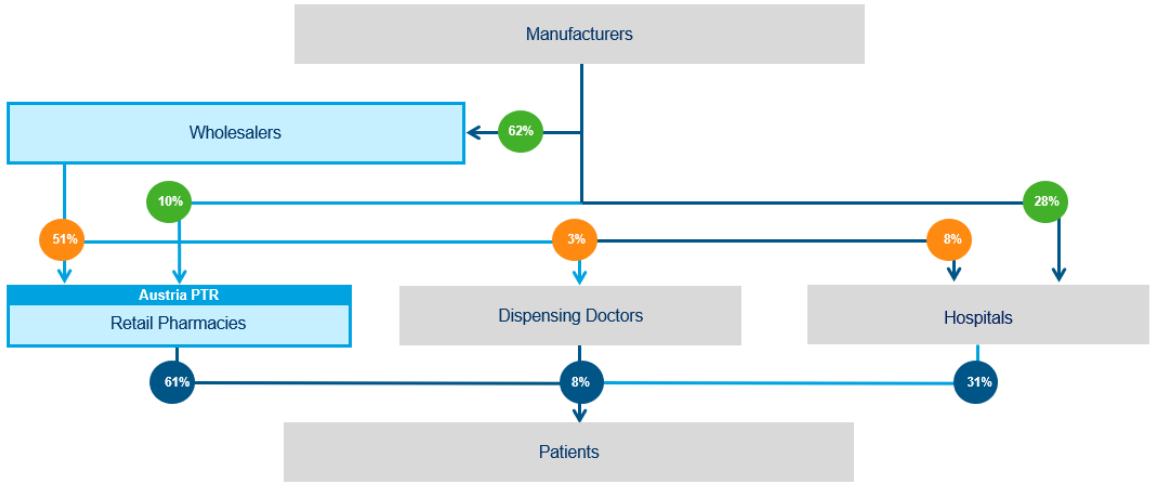




Outcomes

- Overall precision index improved by 1.9 percentage points in 2018
- Overall underestimation remained unchanged in 2018
- To increase panel size for expanding offering granularity to further improve precision.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(+6 vPY)*	**734** *(+350 vPY)*	**18%** *(+9% vPY)*

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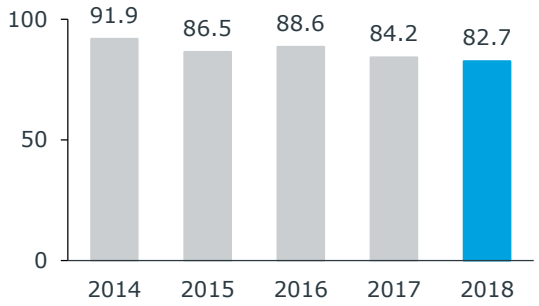
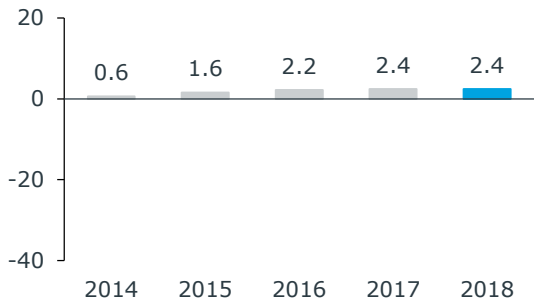
Austria Hospital Validation Study

2018 Validation Study

Validation Results

Precision	82.7%	Bias	2.4%

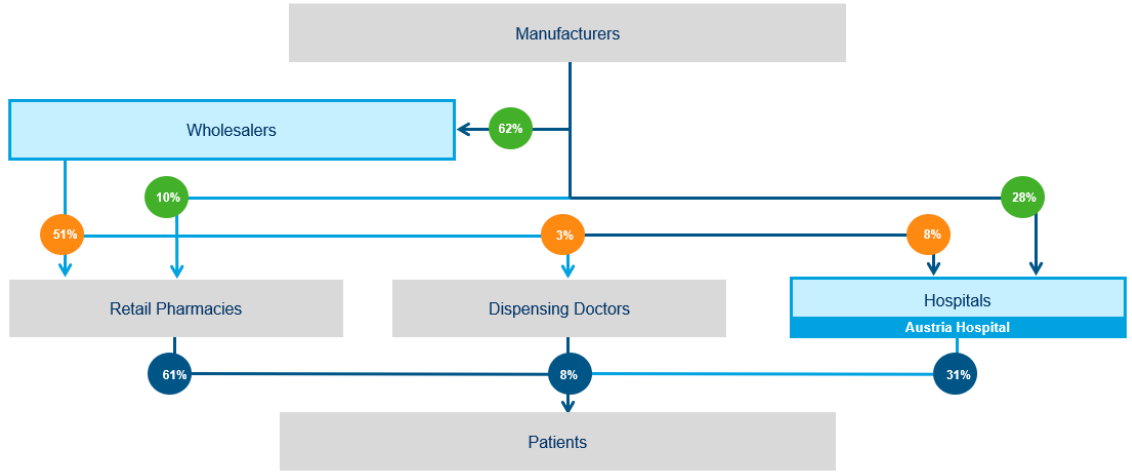




Outcomes

- Overall precision index declined by 1.5 percentage points in 2018
- Overall overestimation remained unchanged in 2018
- To improve projection stratification and adjust projection level.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
10 *(-1 vPY)*	**358** *(+9 vPY)*	**22%** *(no change vPY)*

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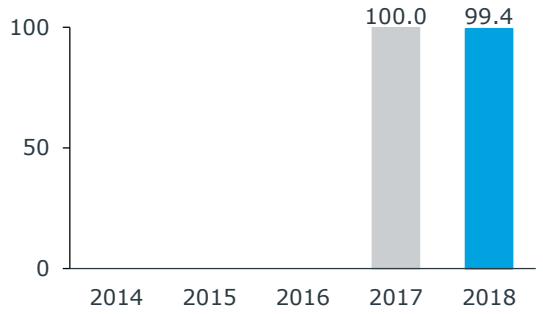
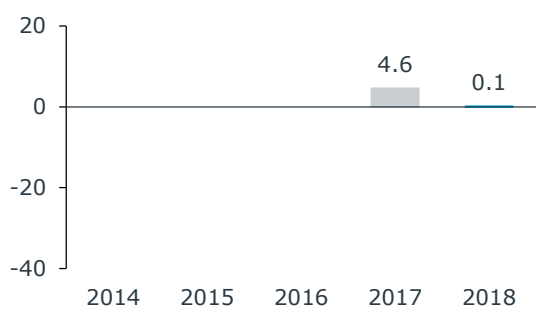
Bosnia Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	99.4%	Bias	0.1%

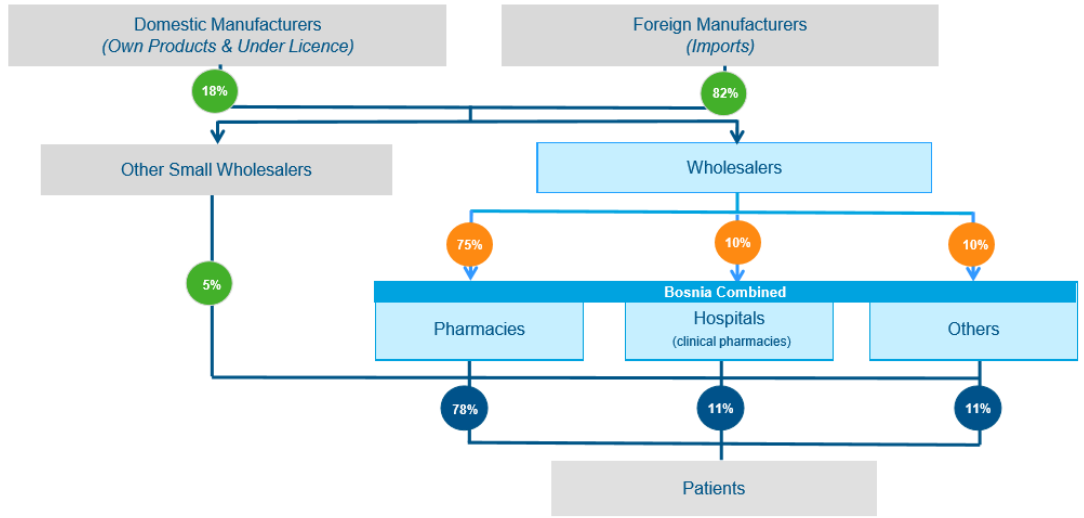




Outcomes

- Overall precision index declined by 0.6 percentage points in 2018
- Overall overestimation improved by 4.5 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(+11 vPY)*	**554** *(+525 vPY)*	**44%** *(+40% vPY)*

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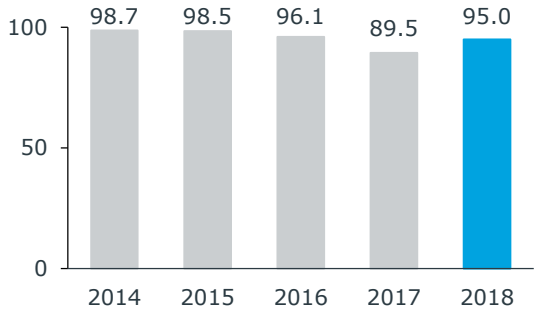
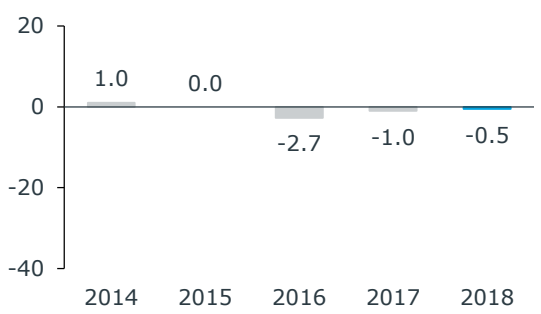
Bulgaria Retail Validation Study

2018 Validation Study

Validation Results

Precision	95.0%	Bias	-0.5%

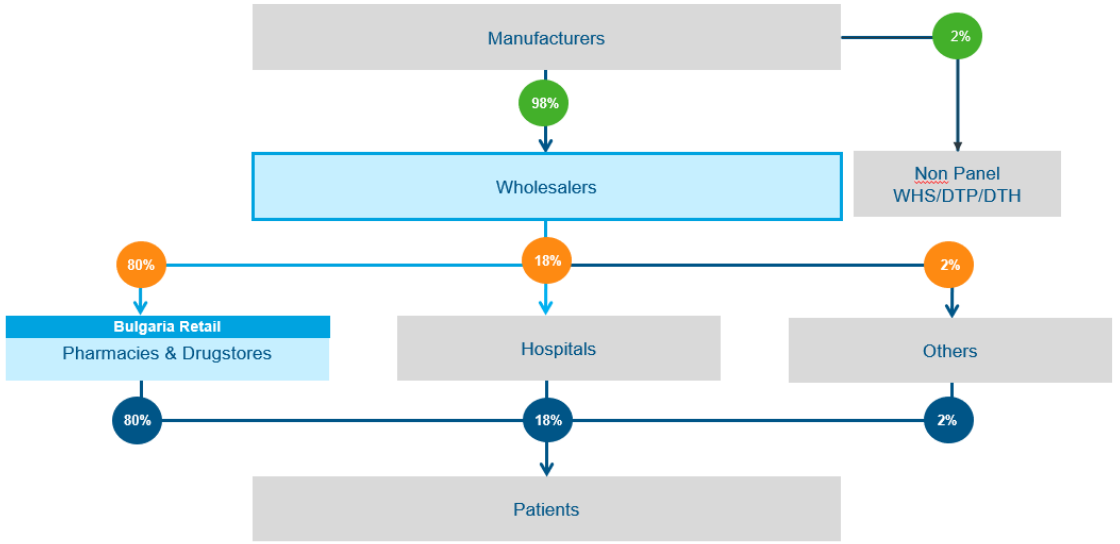




Outcomes

- Overall precision index improved by 5.5 percentage points in 2018
- Overall underestimation improved by 0.5 percentage points in 2018
- To revise reporting of pharmacy warehouses in retail channel and follow up with specific clients where discrepancies have been identified to improve further.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(-32 vPY)*	**308** *(-273 vPY)*	**17%** *(-12% vPY)*

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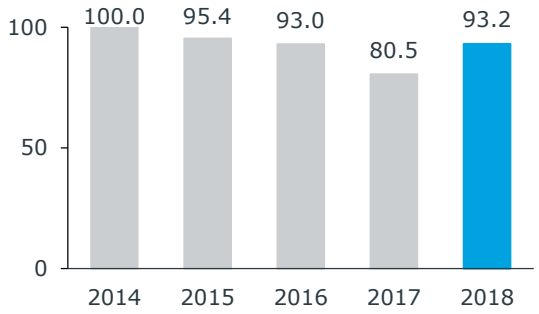
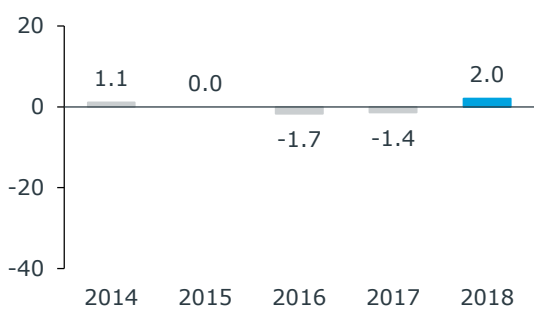
Bulgaria OTC Validation Study

2018 Validation Study

Validation Results

Precision	93.2%	Bias	2.0%

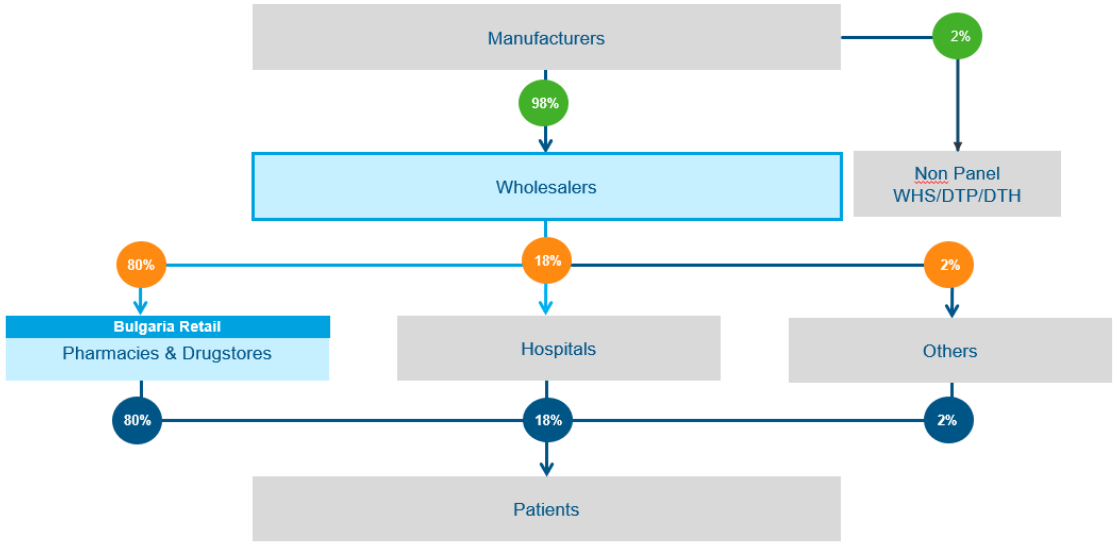




Outcomes

- Overall precision index improved by 12.7 percentage points in 2018
- Overall bias turned from 1.4 underestimation to 2.0 overestimation in 2018
- To revise reporting of pharmacy warehouses in retail channel and follow up with specific clients where discrepancies have been identified to improve further.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
8 *(-19 vPY)*	**59** *(-90 vPY)*	**46%** *(+18% vPY)*

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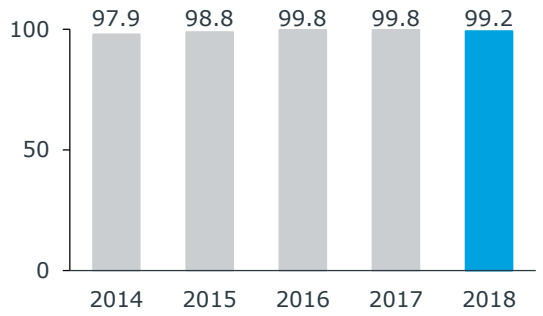
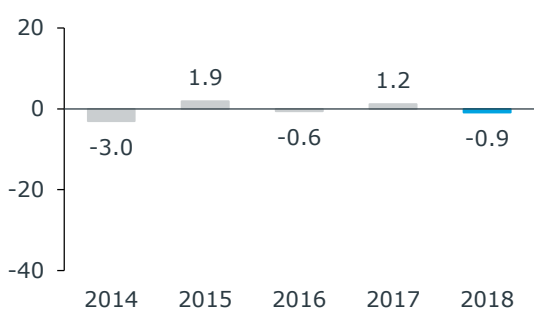
Croatia Retail Validation Study

2018 Validation Study

Validation Results

Precision	99.2%	Bias	-0.9%

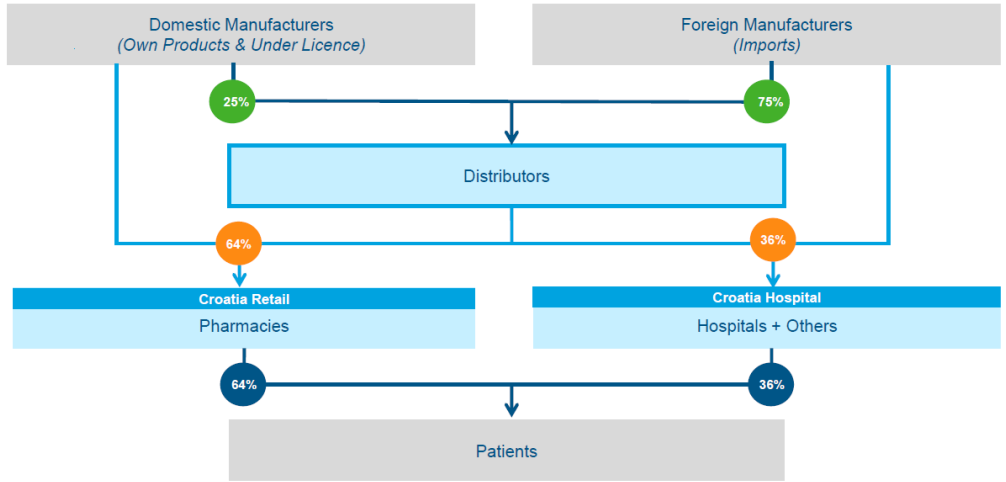




Outcomes

- Overall precision index declined by 0.6 percentage points in 2018
- Overall bias turned from 1.2% overestimation to 0.9% underestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
9 *(no change vPY)*	**410** *(+51 vPY)*	**25%** *(+1% vPY)*

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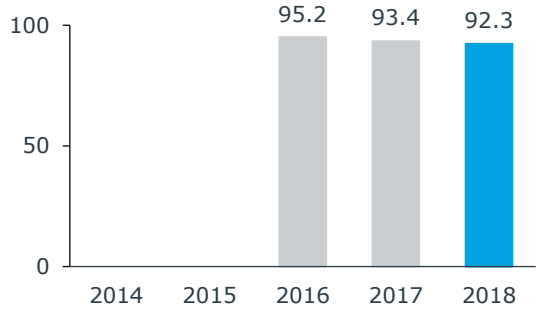
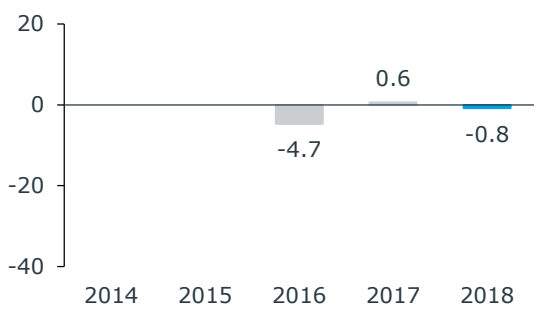
Croatia PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	92.3%	Bias	-0.8%

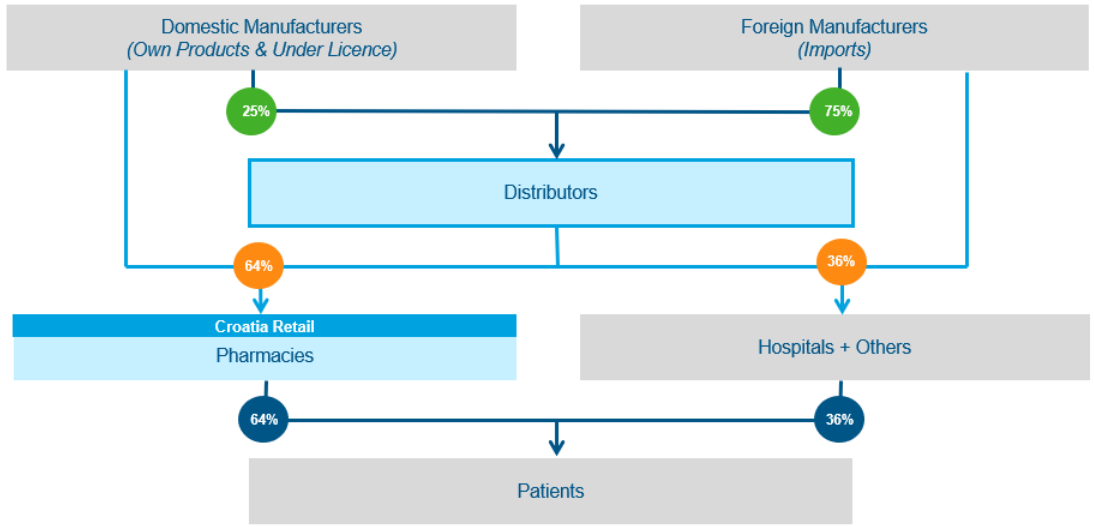




Outcomes

- Overall precision index declined by 1.1 percentage points in 2018
- Overall bias turned from 0.6% overestimation to 0.8% underestimation in 2018
- To improve bridging methodology and quality of incoming data.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
9 *(-2 vPY)*	**338** *(+38 vPY)*	**17%** *(no change vPY)*

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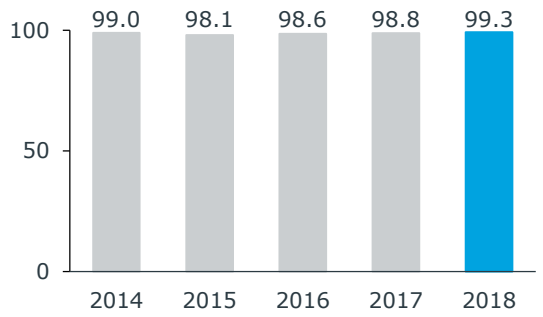
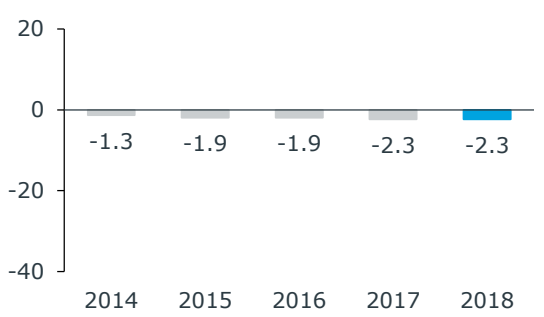
Czech Republic Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	99.3%	Bias	-2.3%

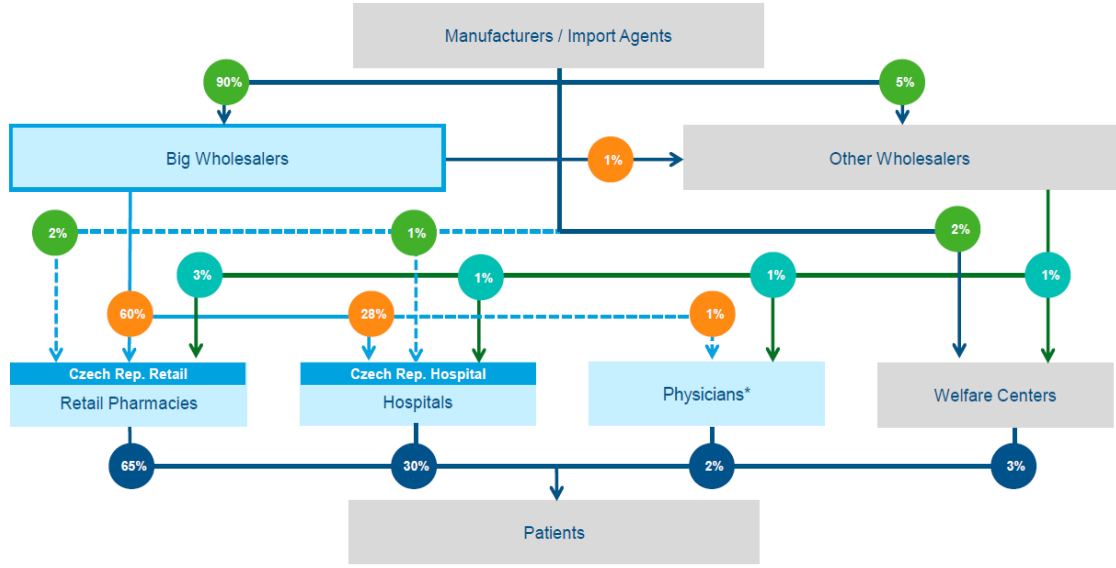




Outcomes

- Overall precision index improved by 0.5 percentage points in 2018
- Overall underestimation remained unchanged at -2.3% in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
25 *(+3 vPY)*	**1,119** *(-148 vPY)*	**37%** *(-11% vPY)*

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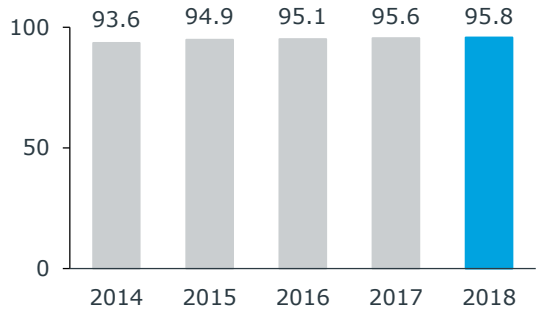
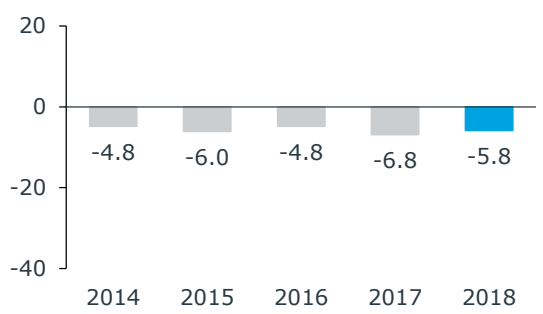
Czech Republic PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	95.8%	Bias	-5.8%

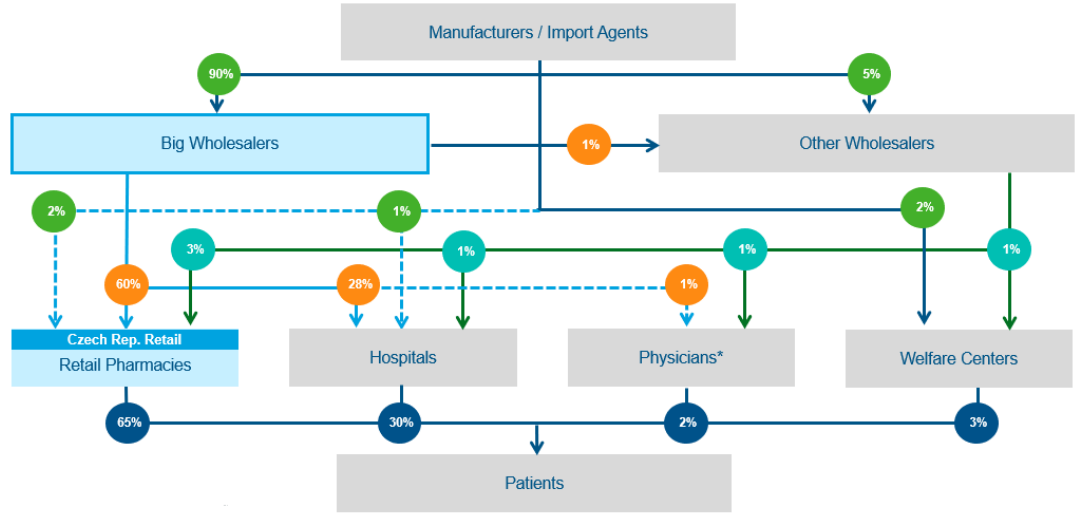




Outcomes

- Overall precision index improved slightly by 0.2 percentage points in 2018
- Overall underestimation improved by 1.0 percentage point in 2018
- To improve projection methodology to further improve precision.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
24 *(+3 vPY)*	**774** *(-102 vPY)*	**25%** *(-5% vPY)*

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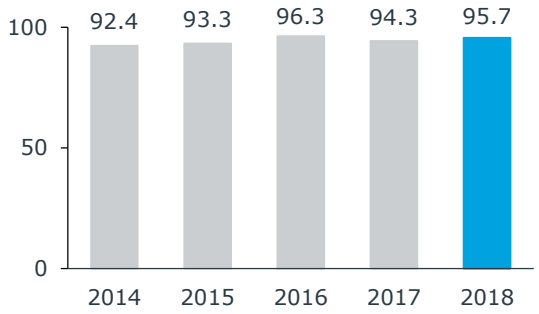
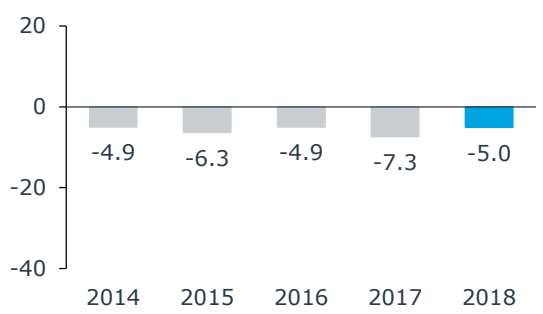
Czech Republic OTC Validation Study

2018 Validation Study

Validation Results

Precision	95.7%	Bias	-5.0%

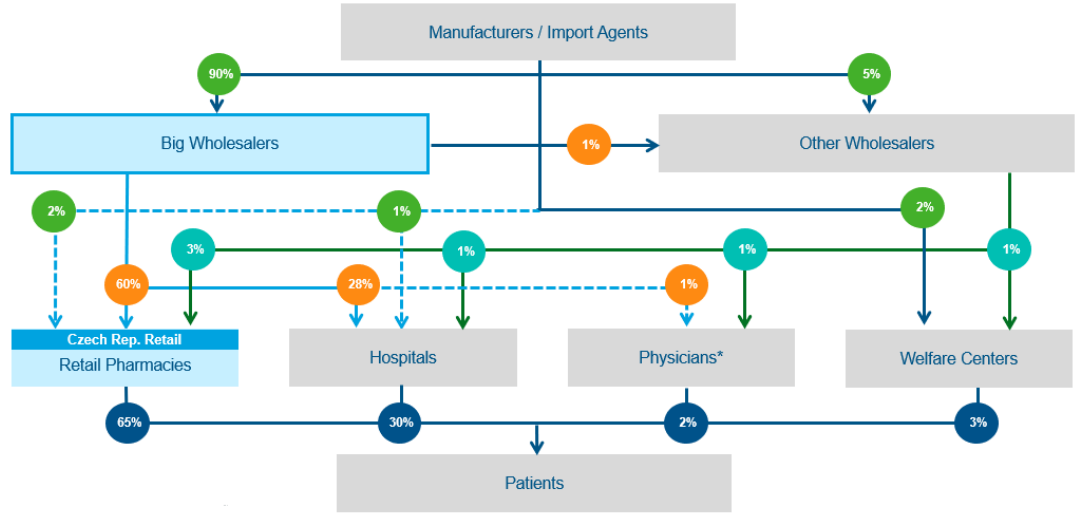




Outcomes

- Overall precision index improved by 1.4 percentage points in 2018
- Overall underestimation improved by 2.3 percentage point in 2018
- To improve projection methodology to further improve precision.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
13 *(no change vPY)*	**216** *(+24 vPY)*	**46%** *(+4% vPY)*

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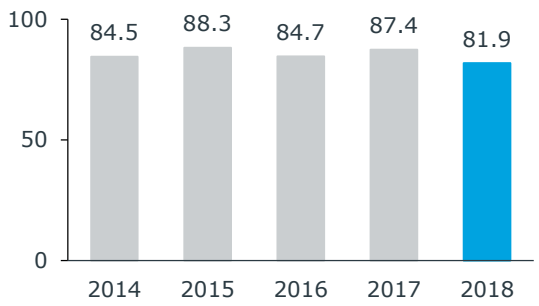
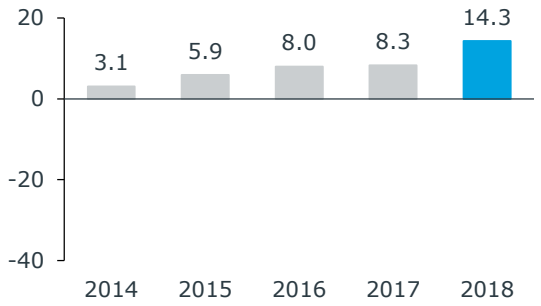
Estonia Retail Validation Study

2018 Validation Study

Validation Results

Precision	81.9%	Bias	14.3%

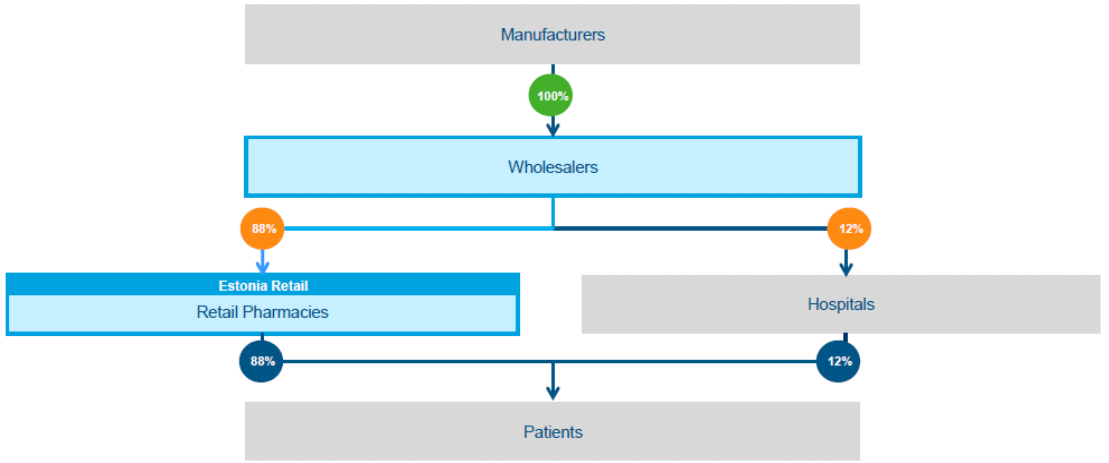




Outcomes

- Overall precision index declined by 5.5 percentage points in 2018
- Overall overestimation increased by 5.0 percentage points in 2018
- To review projection method to improve further.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
21 *(+9 vPY)*	**400** *(+206 vPY)*	**22%** *(+11% vPY)*

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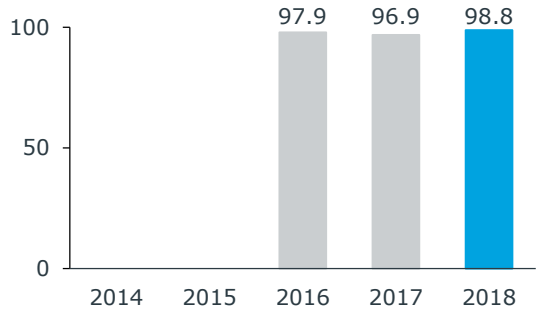
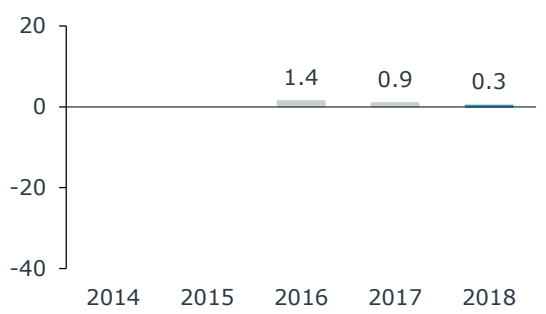
France Retail Validation Study

2018 Validation Study

Validation Results

Precision	98.8%	Bias	0.3%

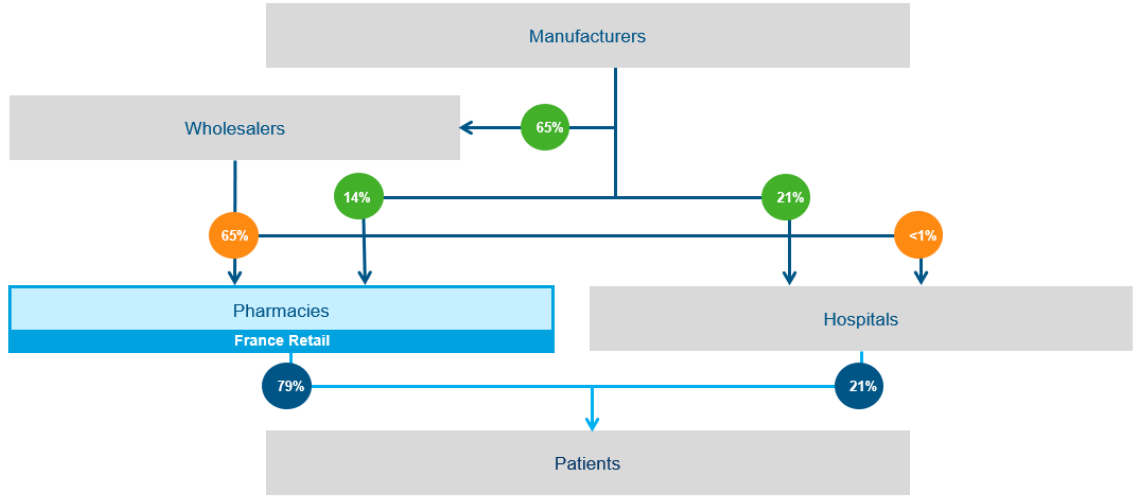




Outcomes

- Overall precision index improved by 1.9 percentage points in 2018
- Overall overestimation improved by 0.6 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
147 *(-1 vPY)*	**2,937** *(-390 vPY)*	**88%** *(-6% vPY)*

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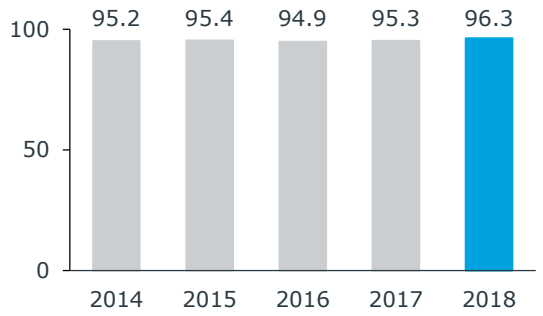
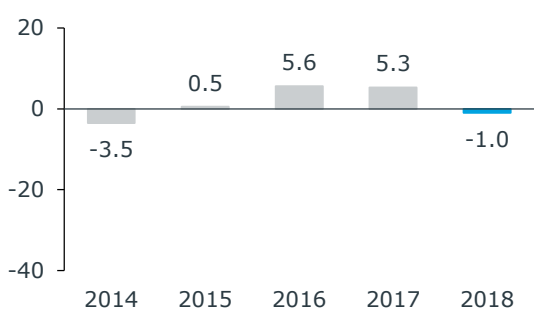
Finland PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	96.3%	Bias	-1.0%

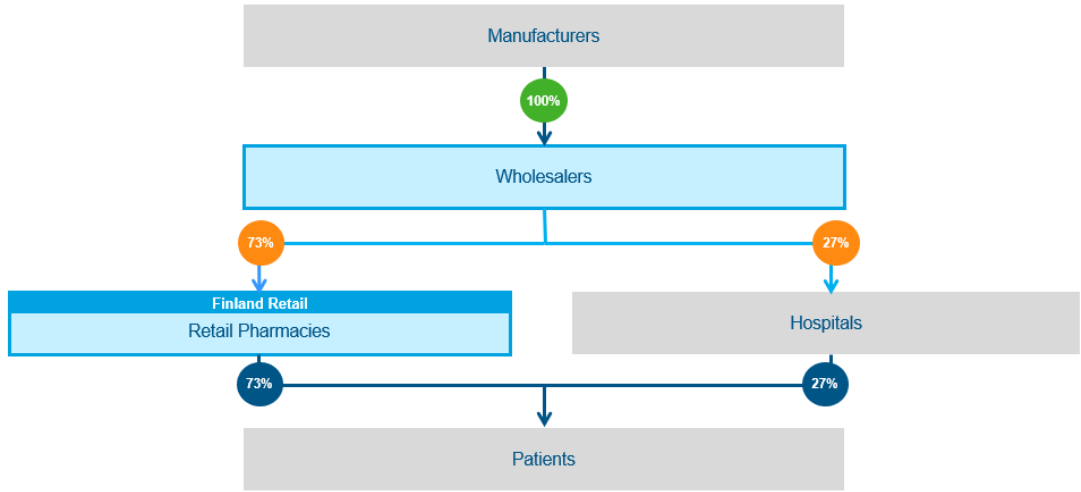




Outcomes

- Overall precision index improved by 1.0 percentage point in 2018
- Overall bias turned from 5.3% overestimation in 2017 to 1.0% underestimation in 2018
- To investigate input data to further improve precision.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
132 *(+12 vPY)*	**1,794** *(+59 vPY)*	**57%** *(-1% vPY)*

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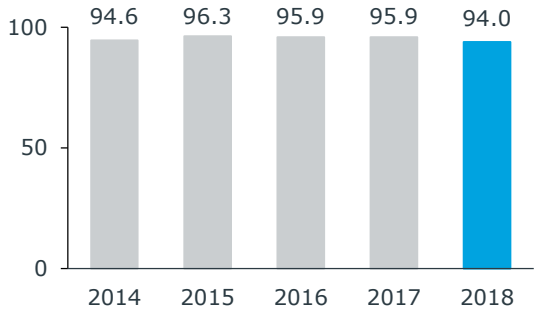
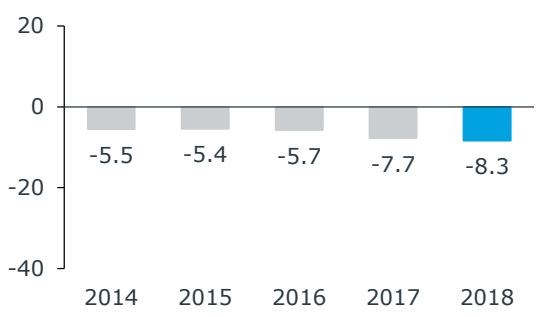
Germany Retail Validation Study

2018 Validation Study

Validation Results

Precision	94.0%	Bias	-8.3%

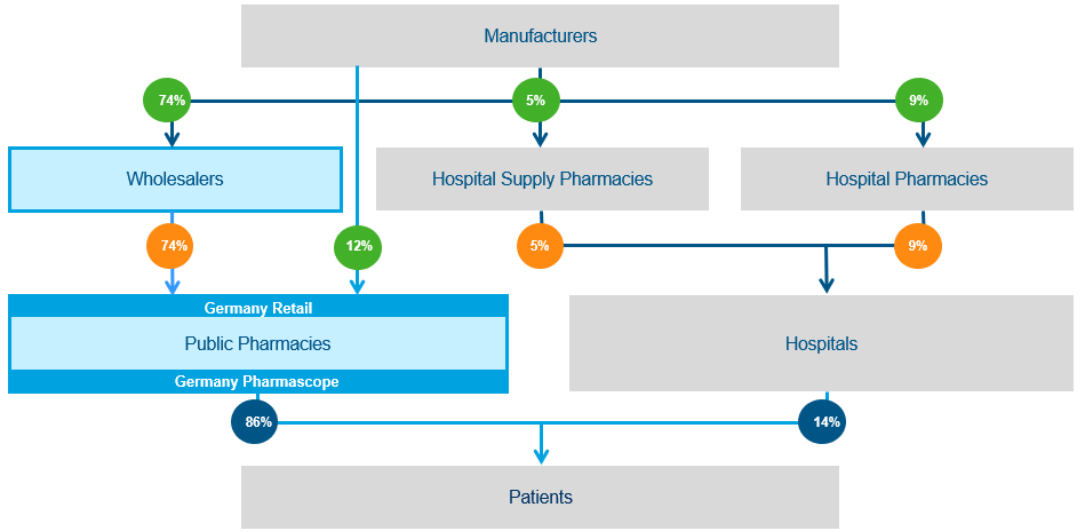




Outcomes

- Overall precision index declined by 1.9 percentage points and underestimation increased by 0.6 percentage points in 2018
- Further investigate bias development over time
- Incorporate new wholesaler
- Win more clients and increase data basis for validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
24 *(-5 vPY)*	**1,720** *(-430 vPY)*	**11%** *(-8% vPY)*

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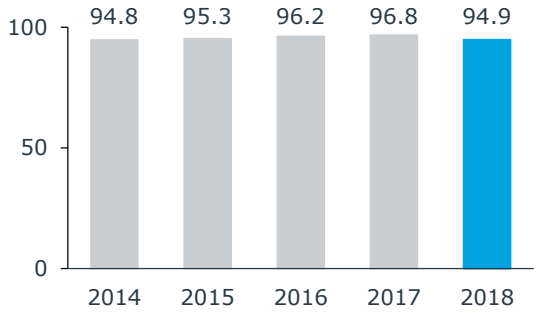
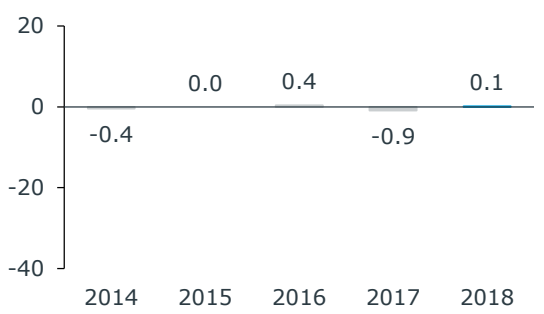
Germany PharmaScope Validation Study

2018 Validation Study

Validation Results

Precision	94.9%	Bias	0.1%

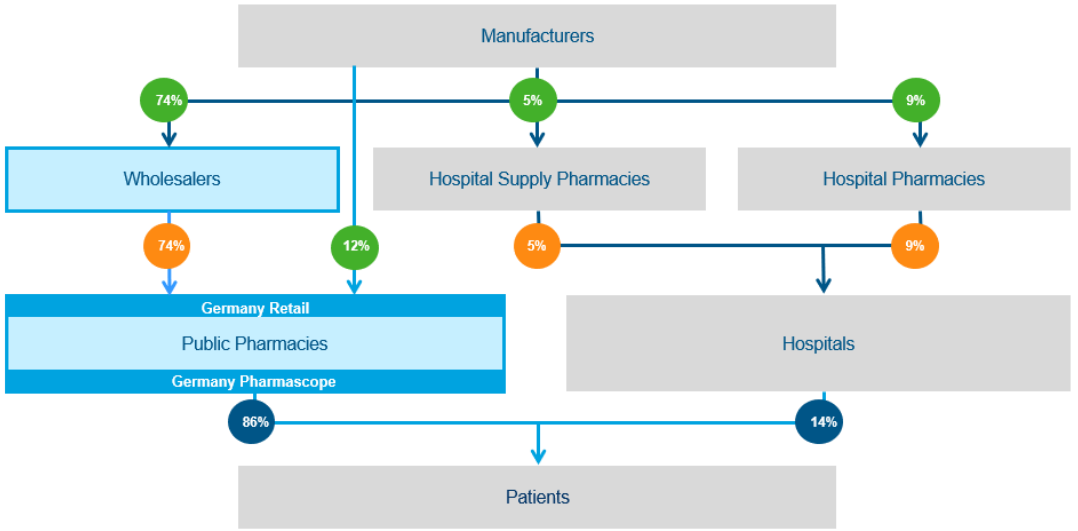




Outcomes

- Overall precision index declined by 1.9 percentage points in 2018
- Overall bias changed from 0.9% underestimation in 2017 to 0.1% overestimation in 2018
- Win more clients and increase data basis for validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
24 *(-5 vPY)*	**1,692** *(-424 vPY)*	**12%** *(-9% vPY)*

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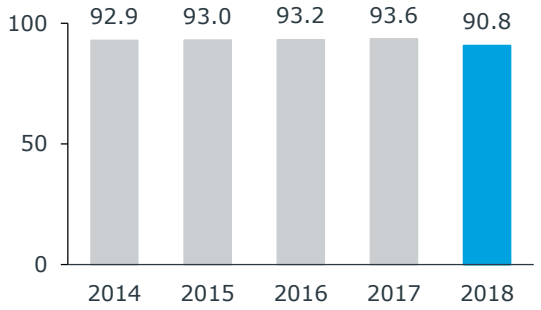
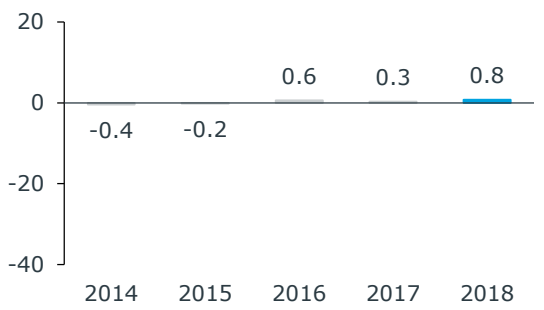
Germany PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	90.8%	Bias	0.8%

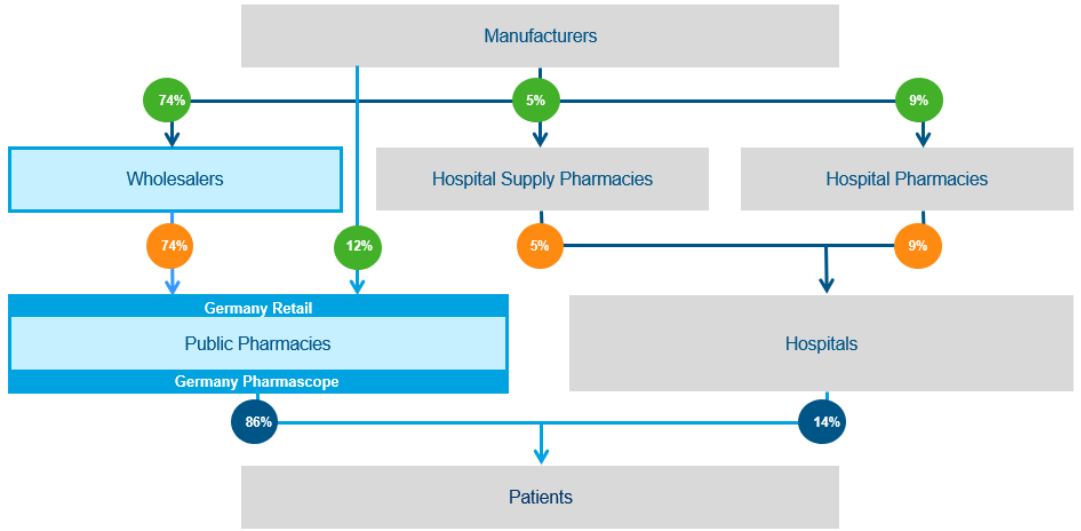




Outcomes

- Overall precision index decreased by 2.8 percentage points in 2018
- Overall overestimation increased by 0.5 percentage points in 2018
- Win more clients and increase data basis for validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
32 *(-4 vPY)*	**2,116** *(-417 vPY)*	**13%** *(-8% vPY)*

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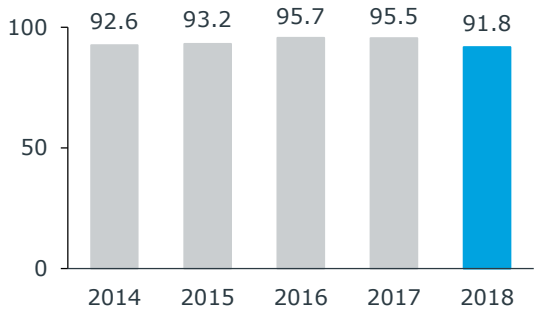
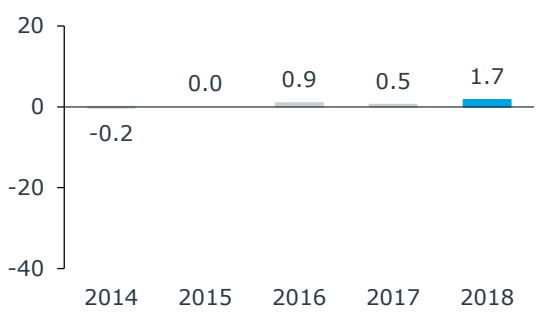
Germany OTC Validation Study

2018 Validation Study

Validation Results

Precision	91.8%	Bias	1.7%

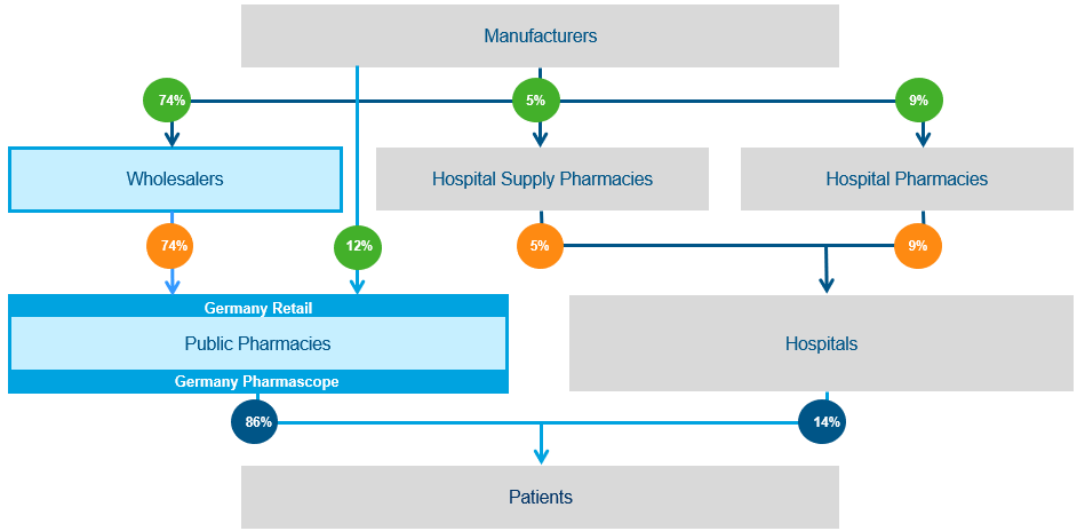




Outcomes

- Overall precision index declined by 3.7 percentage points in 2018
- Overall overestimation increased by 1.2 percentage points in 2018
- Win more clients and increase data basis for validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
16 *(-3 vPY)*	**340** *(-257 vPY)*	**16%** *(-12% vPY)*

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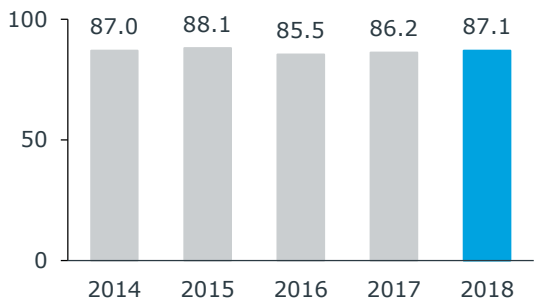
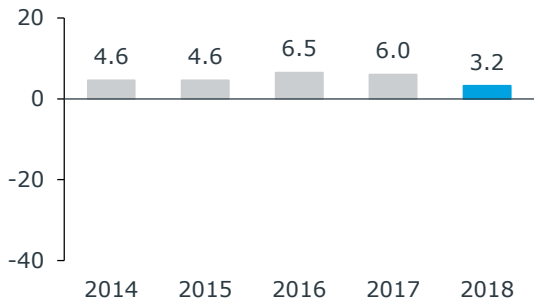
Germany Hospital Validation Study

2018 Validation Study

Validation Results

Precision	87.1%	Bias	3.2%

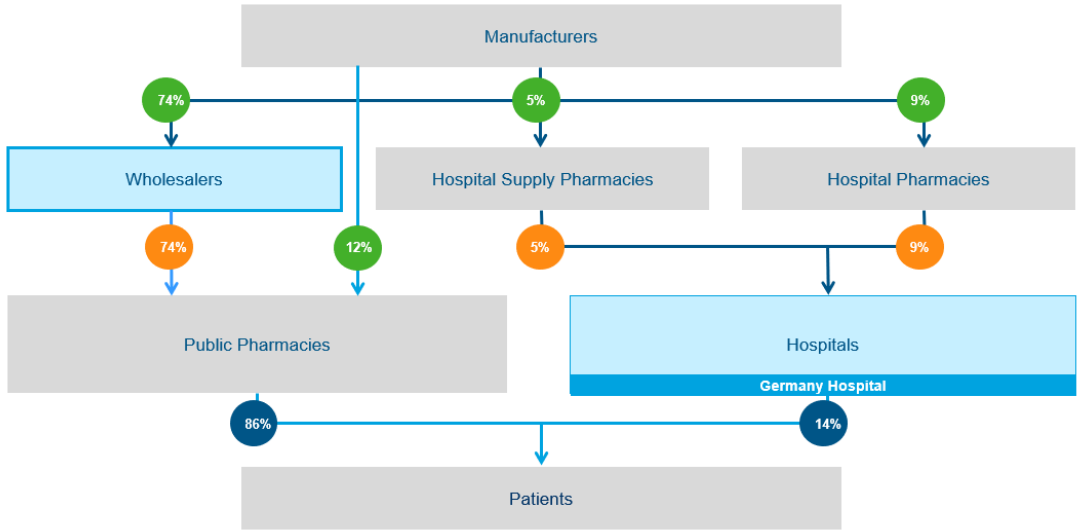




Outcomes

- Overall precision index improved by 0.9 percentage points in 2018
- Overall overestimation improved by 2.8 percentage points in 2018
- Win more clients and increase data basis for validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
23 *(-1 vPY)*	**1,043** *(-37 vPY)*	**39%** *(-10% vPY)*

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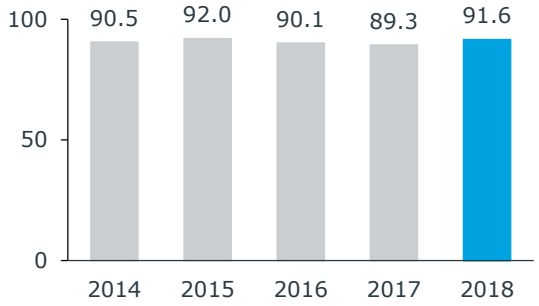
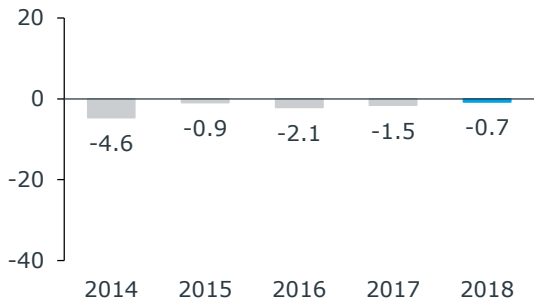
Greece Retail Validation Study

2018 Validation Study

Validation Results

Precision	91.6%	Bias	-0.7%

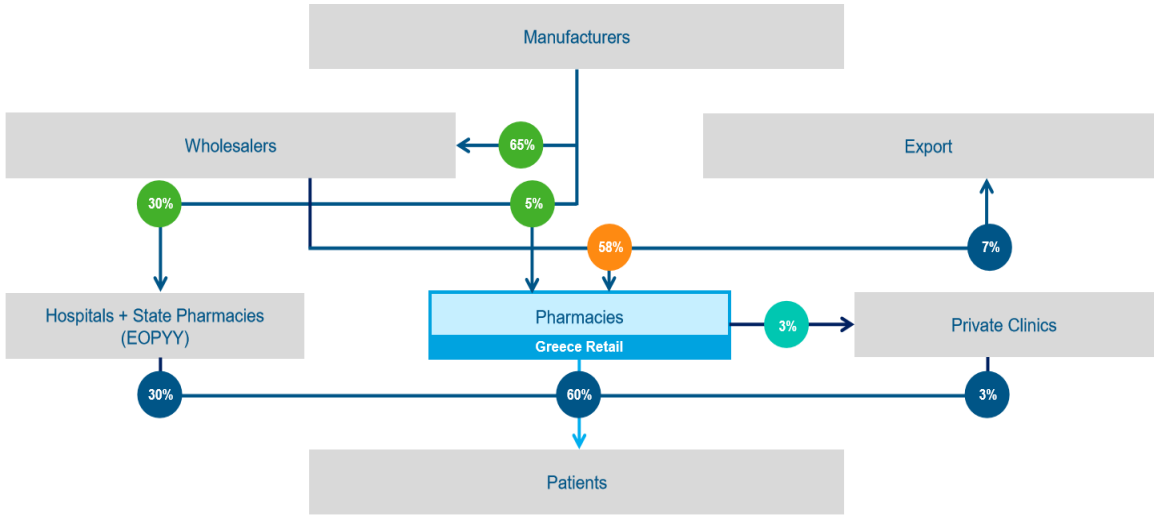




Outcomes

- Overall precision index improved by 2.3 percentage points in 2018
- Overall underestimation improved by 0.8 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
45 *(+3 vPY)*	**942** *(-13 vPY)*	**54%** *(no change vPY)*

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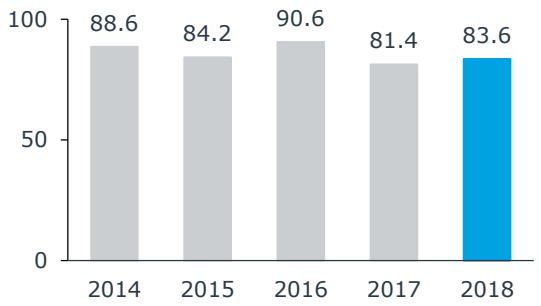
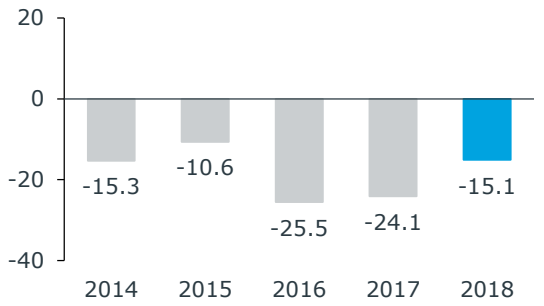
Greece OTC Validation Study

2018 Validation Study

Validation Results

Precision	83.6%	Bias	-15.1%

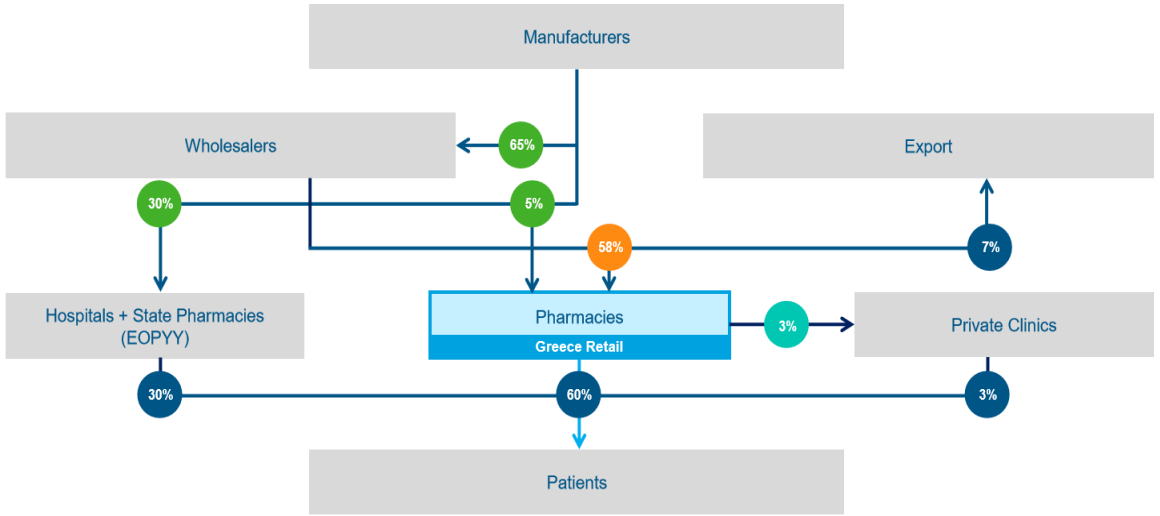




Outcomes

- Overall precision index improved by 2.2 percentage points in 2018
- Overall underestimation improved by 9.0 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(+2 vPY)*	**75** *(+5 vPY)*	**16%** *(-9% vPY)*

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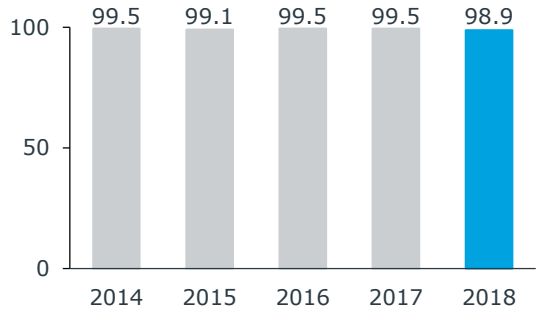
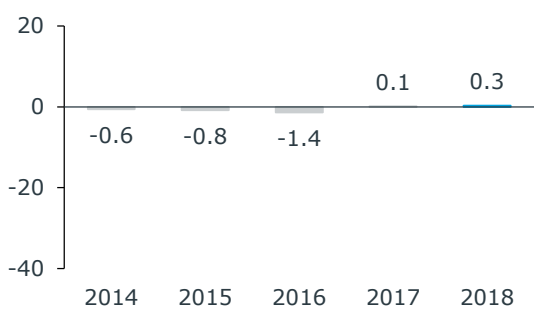
Hungary Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	98.9%	Bias	0.3%

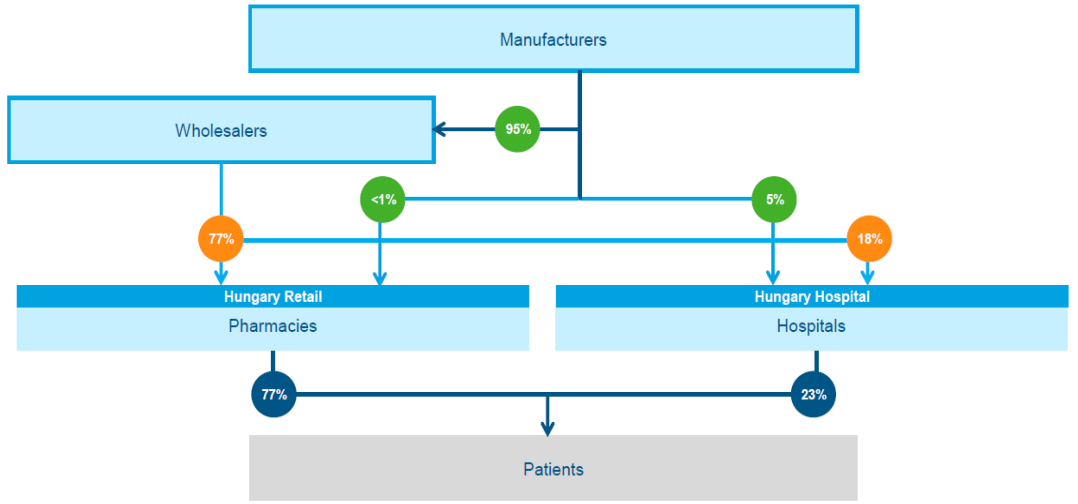




Outcomes

- Overall precision index declined by 0.6 percentage points in 2018
- Overall overestimation increased by 0.2 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
67 *(+14 vPY)*	**1,559** *(+339 vPY)*	**72%** *(+15% vPY)*

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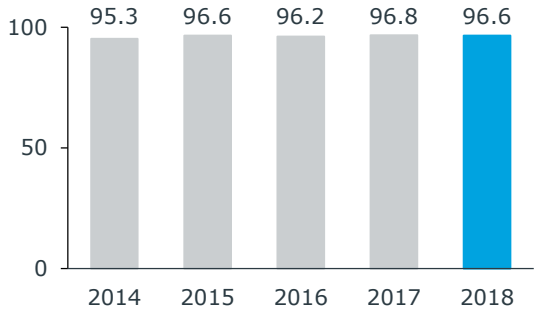
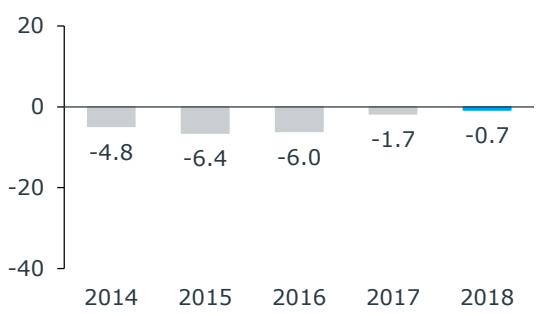
Hungary PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	96.6%	Bias	-0.7%

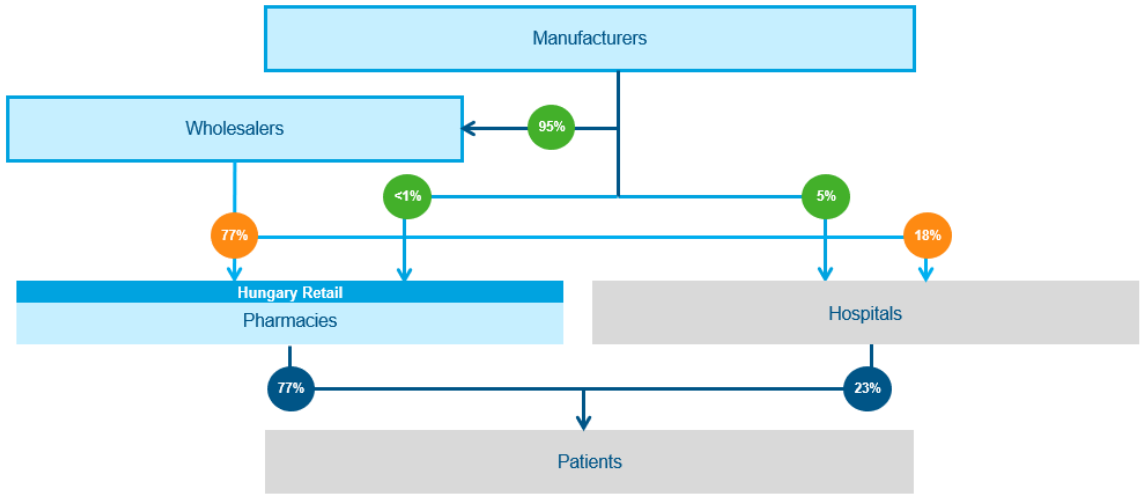




Outcomes

- Overall precision index improved by 1.0 percentage point in 2018
- Overall underestimation improved slightly by 0.2 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
64 *(+15 vPY)*	**1,352** *(+306 vPY)*	**59%** *(+13% vPY)*

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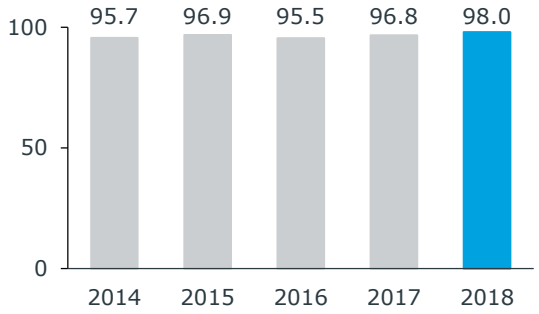
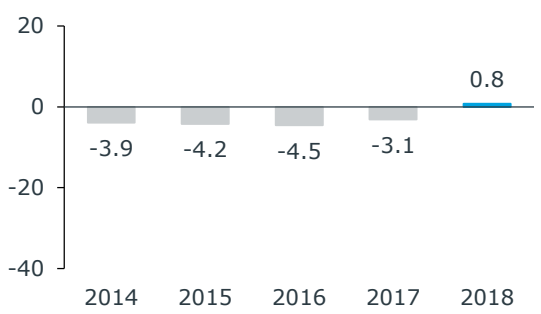
Hungary OTC Validation Study

2018 Validation Study

Validation Results

Precision	98.0%	Bias	0.8%

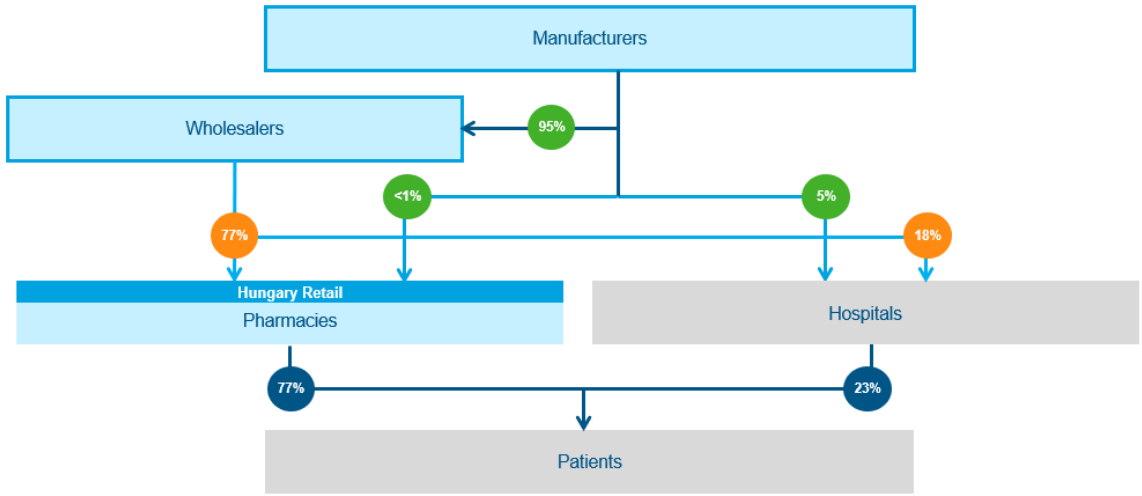




Outcomes

- Overall precision index improved by 1.2 percentage point in 2018
- Overall bias turned from 3.1% underestimation in 2017 to 0.8% overestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
39 *(+13 vPY)*	**344** *(+96 vPY)*	**69%** *(+16% vPY)*

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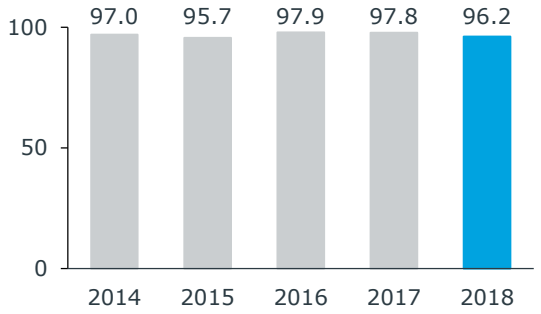
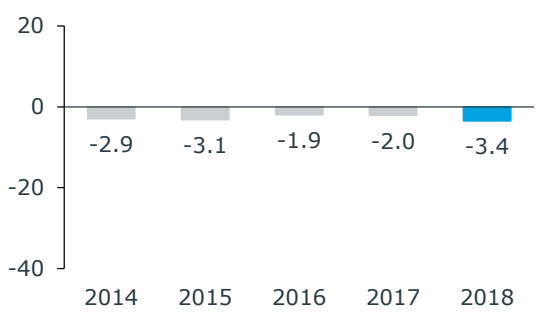
Italy Retail Validation Study

2018 Validation Study

Validation Results

Precision	96.2%	Bias	-3.4%

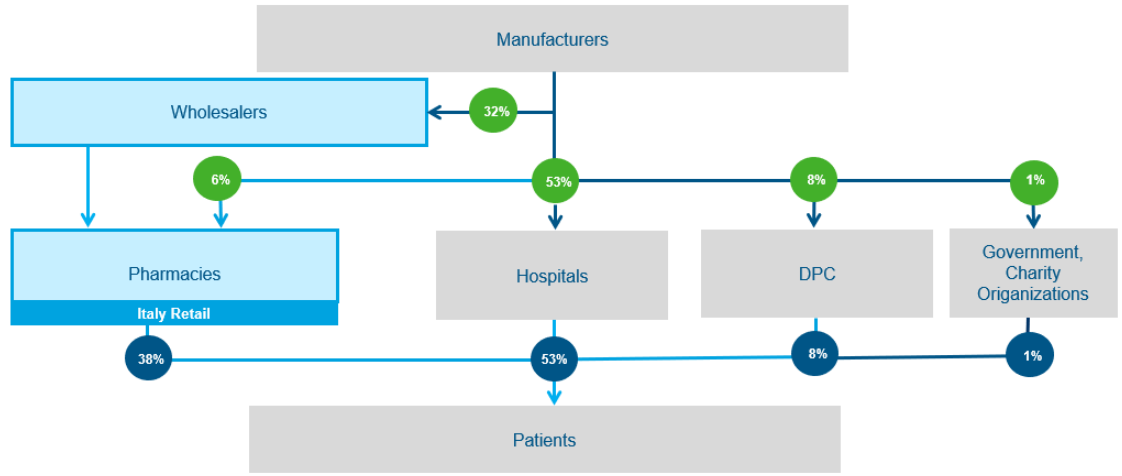




Outcomes

- Overall precision index declined by 1.6 percentage points in 2018
- Overall underestimation increased by 1.4 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
35 *(-8 vPY)*	**1,496** *(+385 vPY)*	**34%** *(+6% vPY)*

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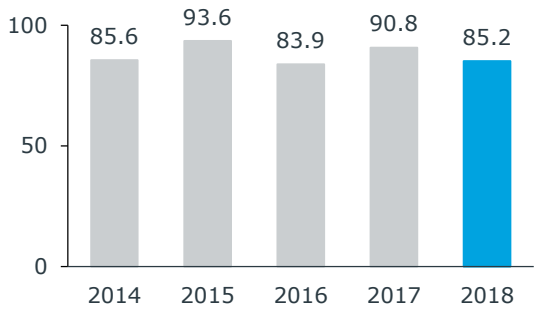
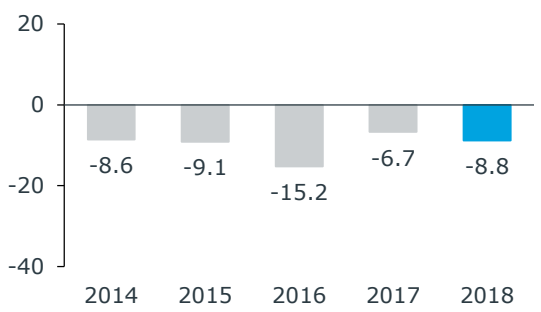
Italy Hospital Validation Study

2018 Validation Study

Validation Results

Precision	85.2%	Bias	-8.8%

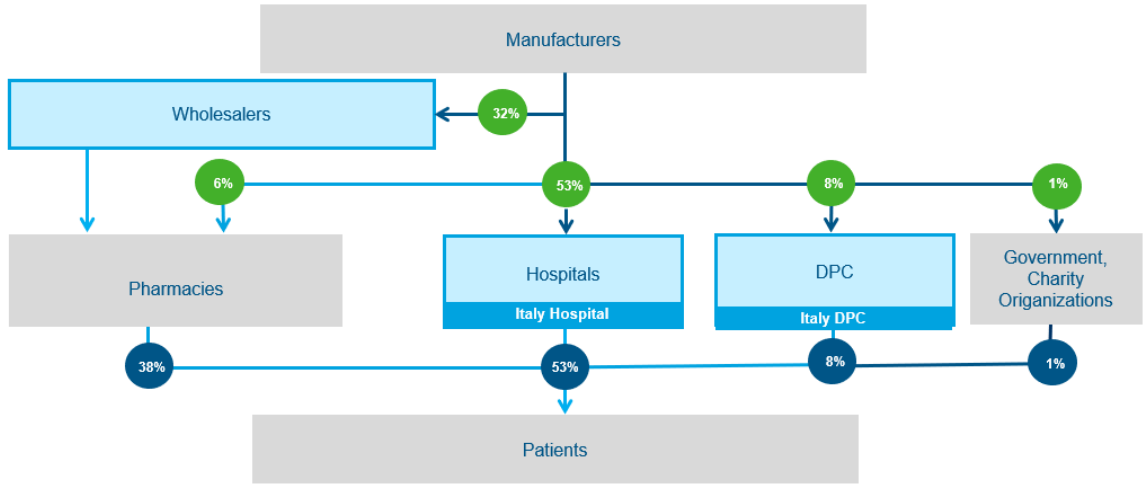




Outcomes

- Overall precision index declined by 5.6 percentage points in 2018
- Overall underestimation increased by 2.1 percentage points in 2018
- To continue implement quality-improving actions.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
17 *(+7 vPY)*	**316** *(+83 vPY)*	**26%** *(+2% vPY)*

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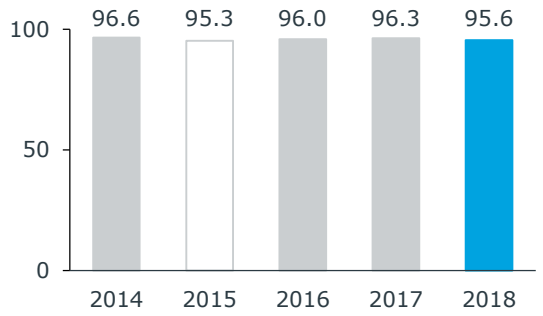
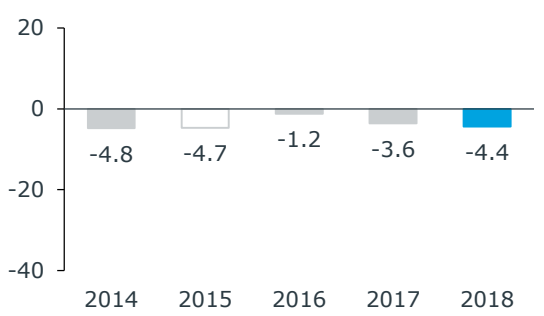
Italy PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	95.6%	Bias	-4.4%

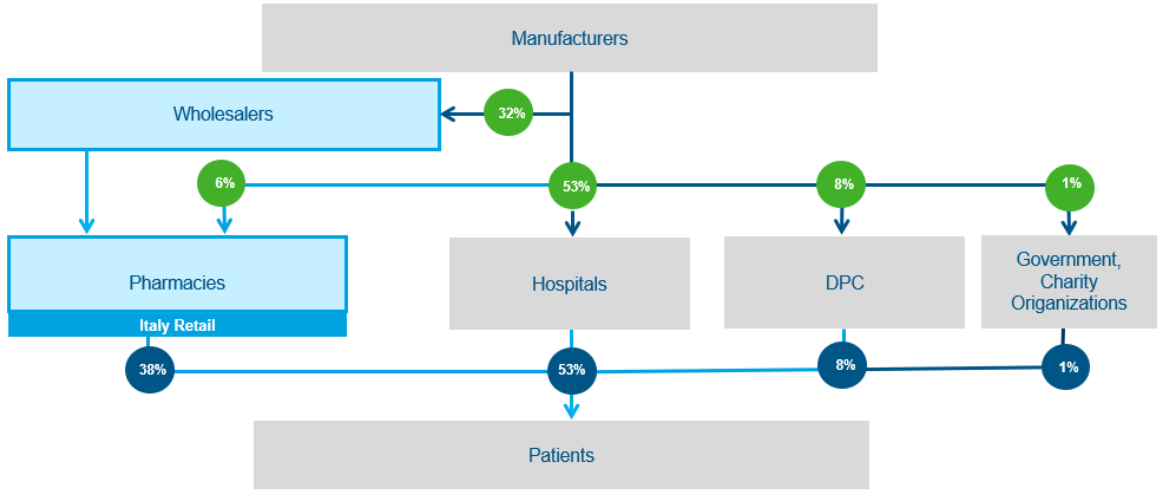




Outcomes

- Overall precision index decreased slightly by 0.7 percentage points in 2018
- Overall underestimation increased slightly by 0.8 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
34 *(+8 vPY)*	**1,443** *(+369 vPY)*	**30%** *(+4% vPY)*

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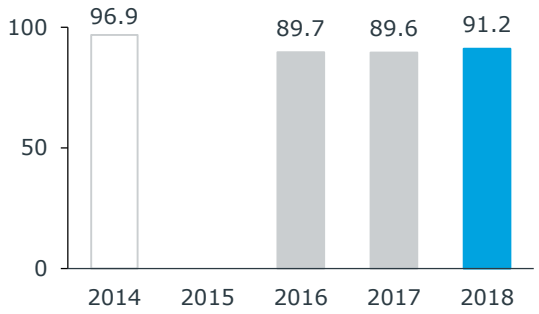
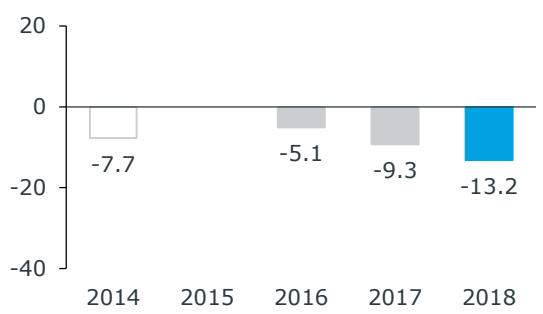
Italy OTC Validation Study

2018 Validation Study

Validation Results

Precision	91.2%	Bias	-13.2%

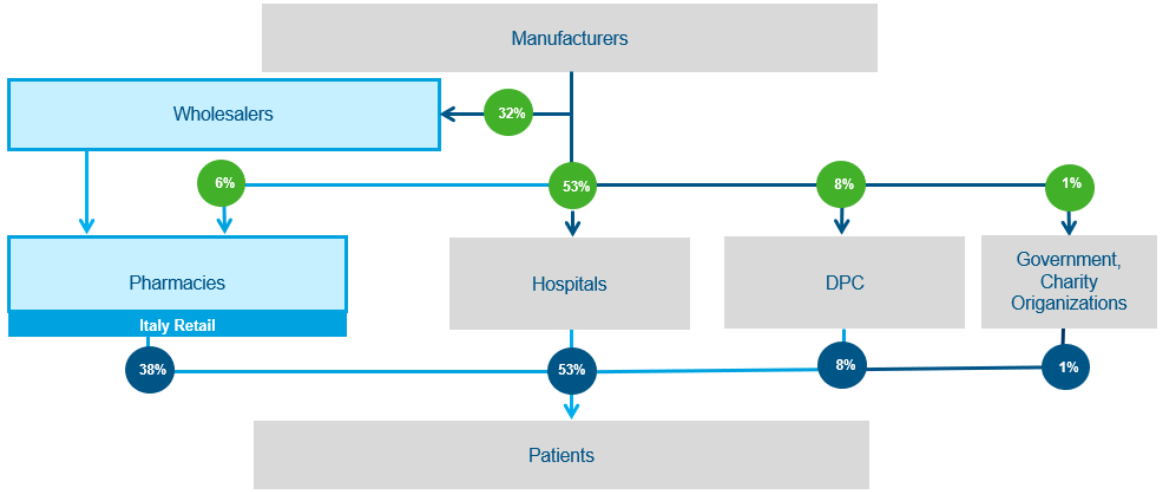




Outcomes

- Overall precision index improved by 1.6 percentage points in 2018
- Overall underestimation increased by 3.9 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
20 *(+5 vPY)*	**92** *(+16 vPY)*	**11%** *(+1% vPY)*

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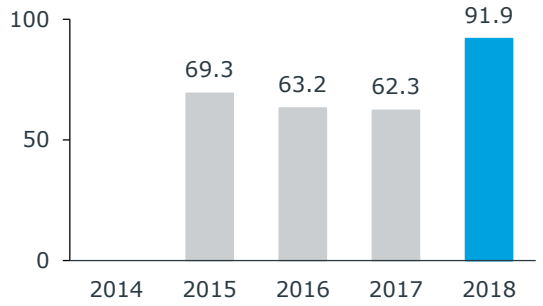
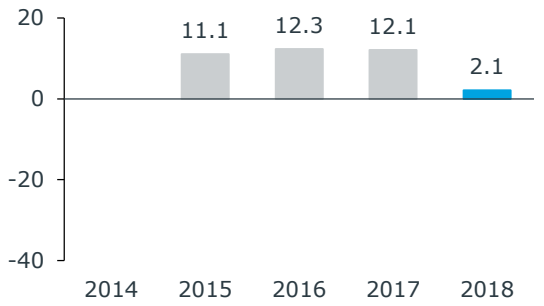
Kazakhstan Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	91.9%	Bias	2.1%

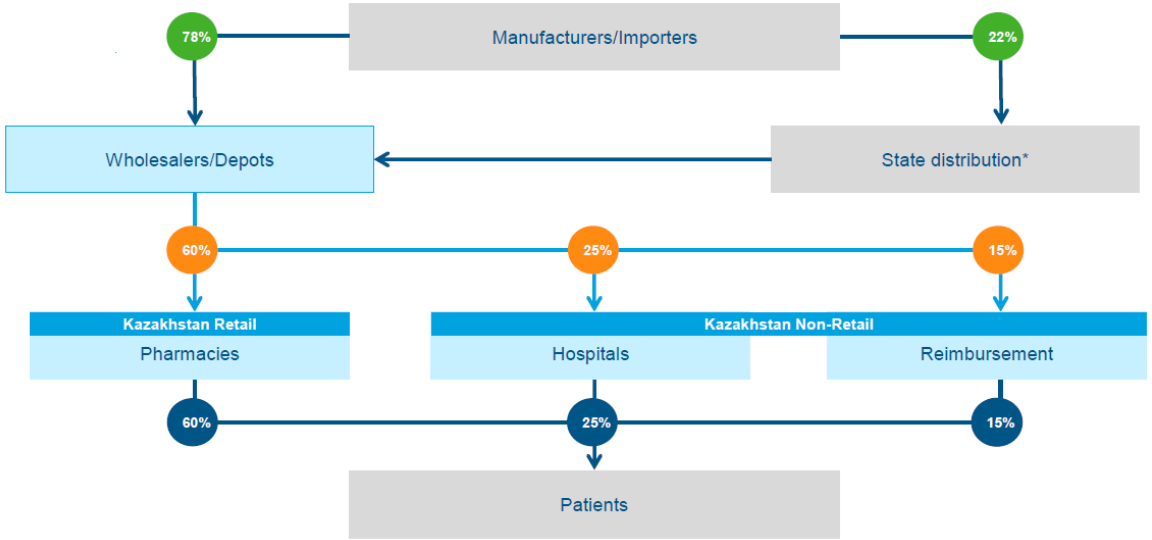




Outcomes

- Overall precision index improved by 29.6 percentage points in 2018
- Overall overestimation improved by 10.0 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
43 *(+11 vPY)*	**469** *(+57 vPY)*	**18%** *(+3% vPY)*

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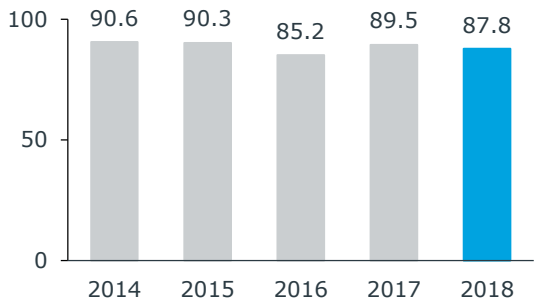
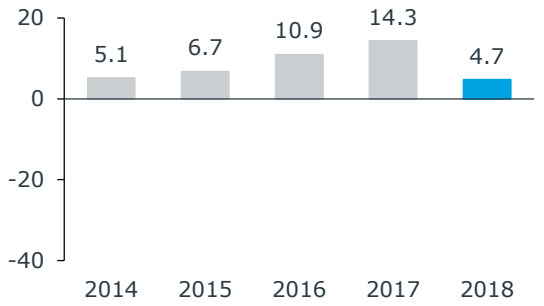
Latvia Retail Validation Study

2018 Validation Study

Validation Results

Precision	87.8%	Bias	4.7%

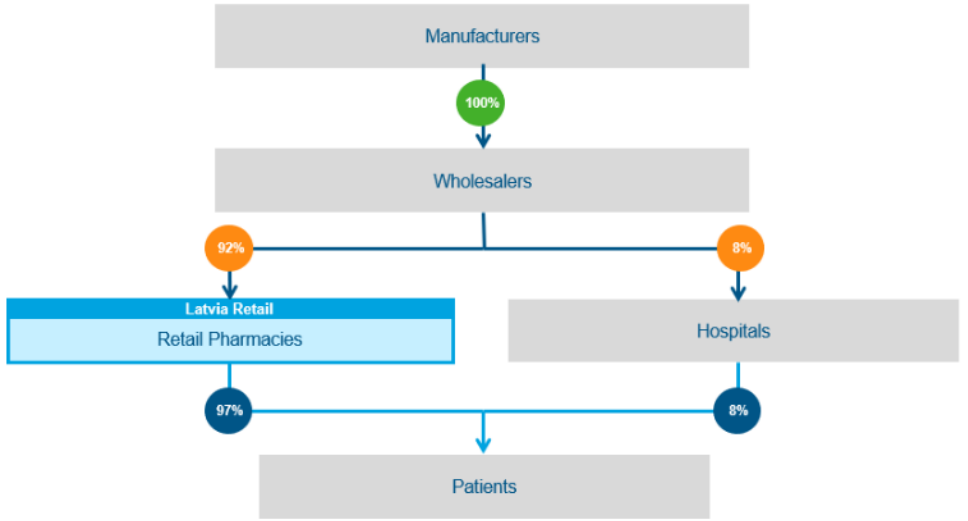




Outcomes

- Overall precision index declined by 1.7 percentage points in 2018
- Overall overestimation improved by 9.6 percentage points in 2018
- To increase panel size and review projection methodology.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
23 *(+2 vPY)*	**385** *(-96 vPY)*	**19%** *(-6% vPY)*

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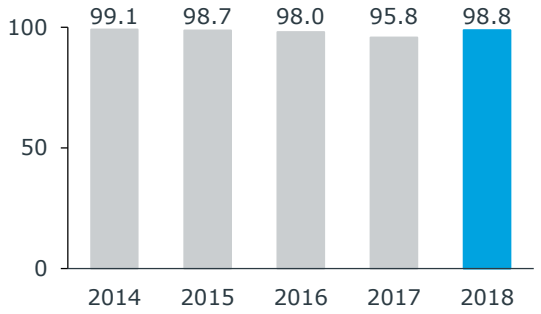
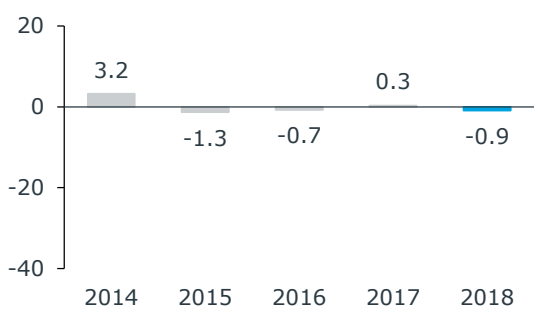
Lithuania Retail Validation Study

2018 Validation Study

Validation Results

Precision	98.8%	Bias	-0.9%

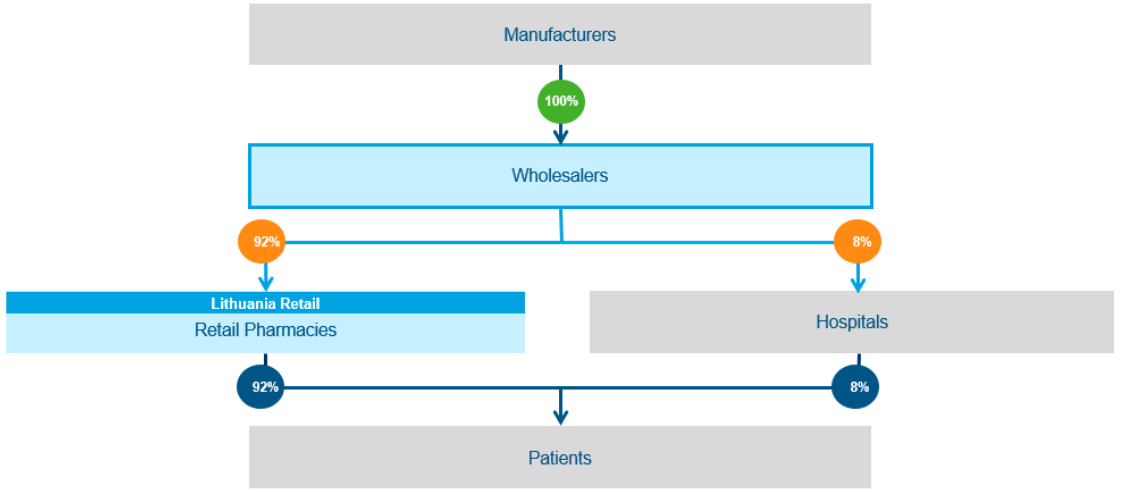




Outcomes

- Overall precision index improved by 3.0 percentage points in 2018
- Overall bias turned from 0.3% overestimation in 2017 to 0.9% underestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
24 *(-3 vPY)*	**483** *(+14 vPY)*	**22%** *(-8% vPY)*

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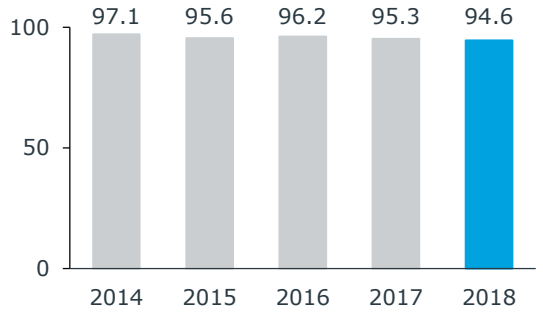
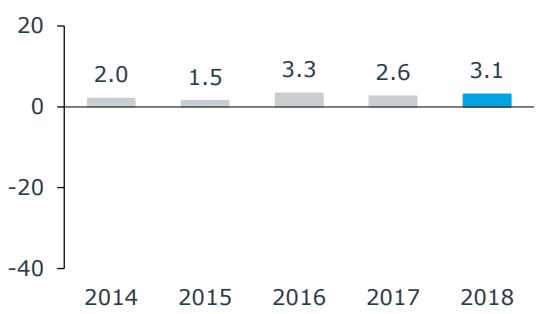
Poland Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	94.6%	Bias	3.1%

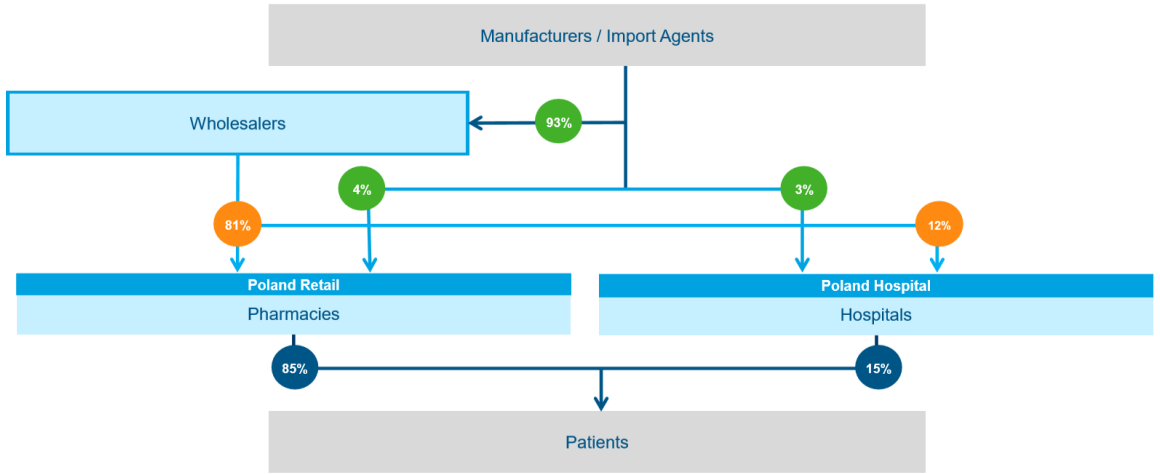




Outcomes

- Overall precision index declined by 0.7 percentage points in 2018
- Overall overestimation increased by 0.5 percentage points in 2018
- Annual revision of projection factors.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
64 *(+5 vPY)*	**1,070** *(-187 vPY)*	**21%** *(-9% vPY)*

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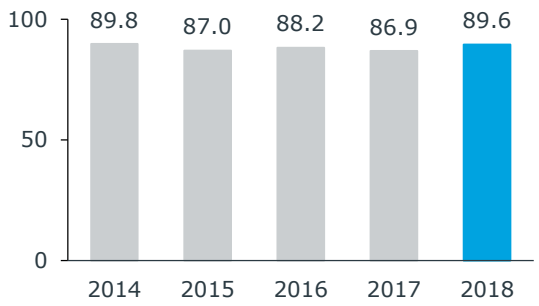
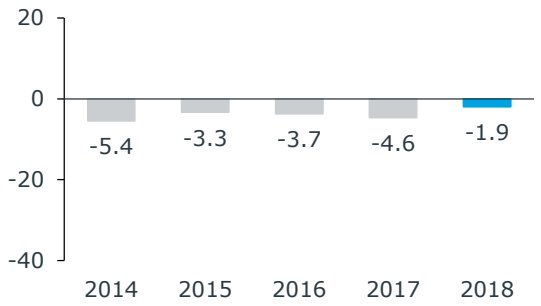
Poland PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	89.6%	Bias	-1.9%

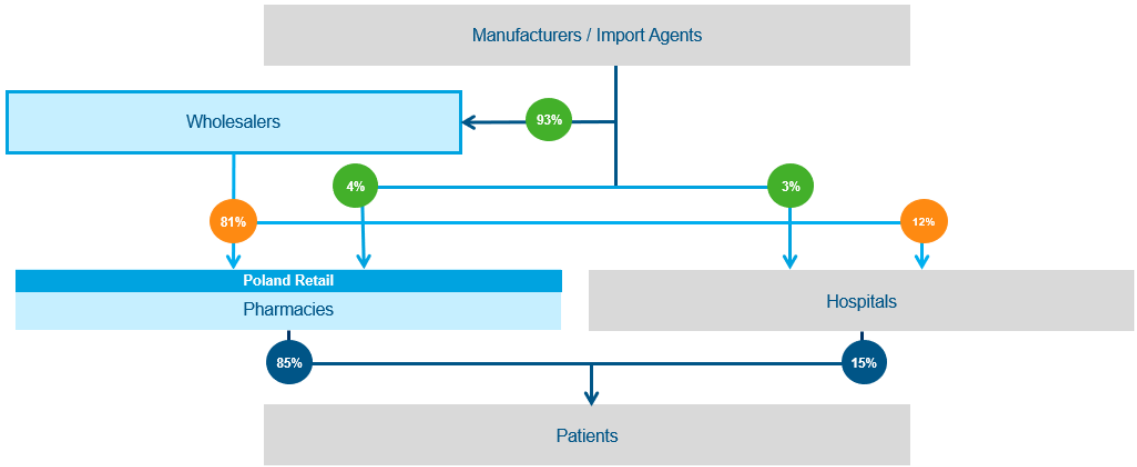




Outcomes

- Overall precision index improved by 2.7 percentage points in 2018
- Overall underestimation improved by 2.7 percentage points in 2018
- To conduct annual revision of projection.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
60 *(+4 vPY)*	**932** *(-163 vPY)*	**15%** *(-6% vPY)*

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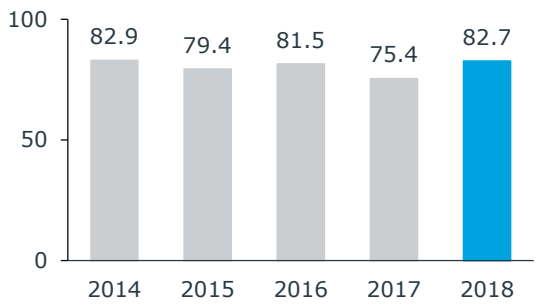
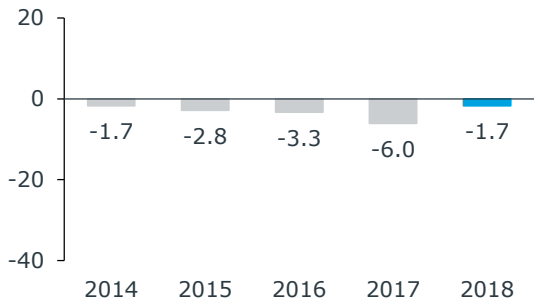
Poland OTC Validation Study

2018 Validation Study

Validation Results

Precision	82.7%	Bias	-1.7%

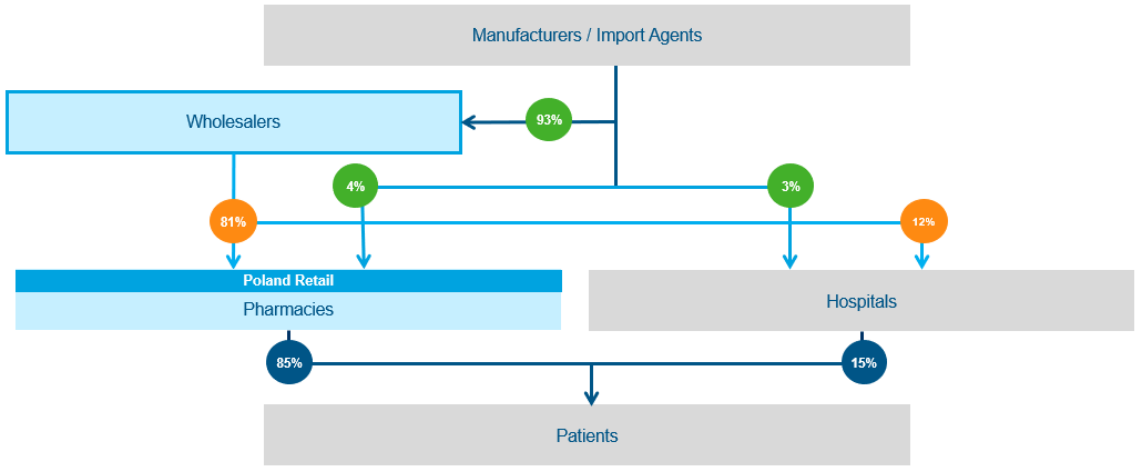




Outcomes

- Overall precision index improved by 7.3 percentage points in 2018
- Overall underestimation improved by 4.3 percentage points in 2018
- To conduct annual revision of projection.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
34 *(-2 vPY)*	**267** *(-107 vPY)*	**17%** *(-11% vPY)*

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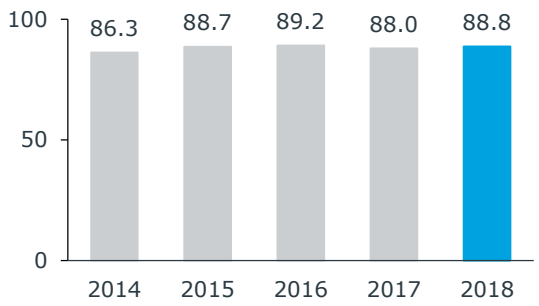
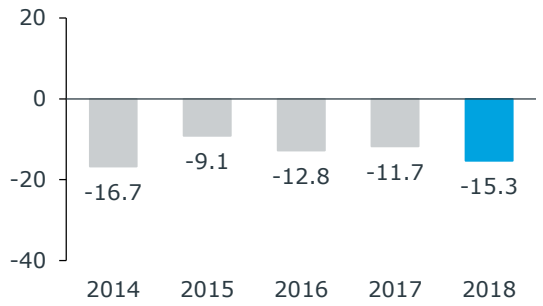
Russia Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	88.8%	Bias	-15.3%

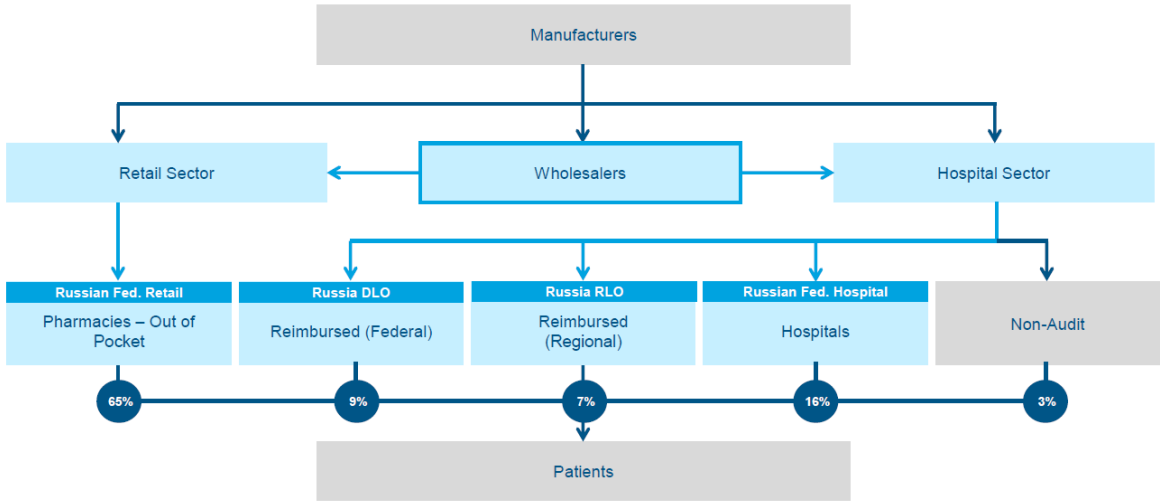




Outcomes

- Overall precision index improved by 0.8 percentage points in 2018
- Overall underestimation increased by 3.6 percentage points in 2018
- Increase panel, improve the quality control methods of input data

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
122 *(+20 vPY)*	**2,126** *(+334 vPY)*	**39%** *(+8% vPY)*

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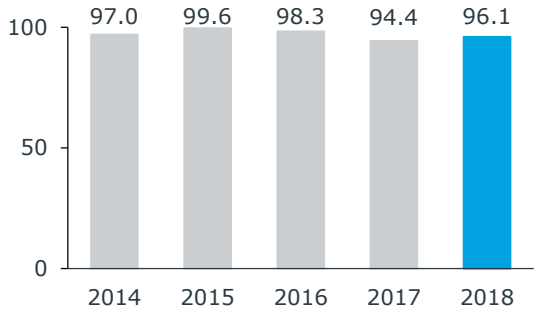
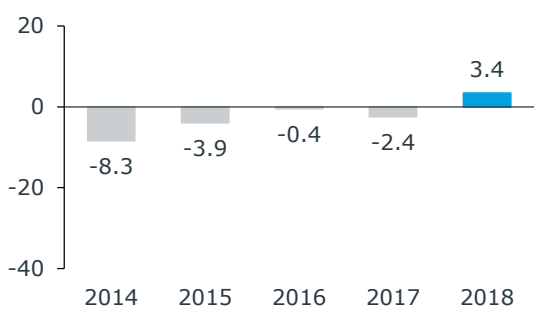
Serbia Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	96.1%	Bias	3.4%

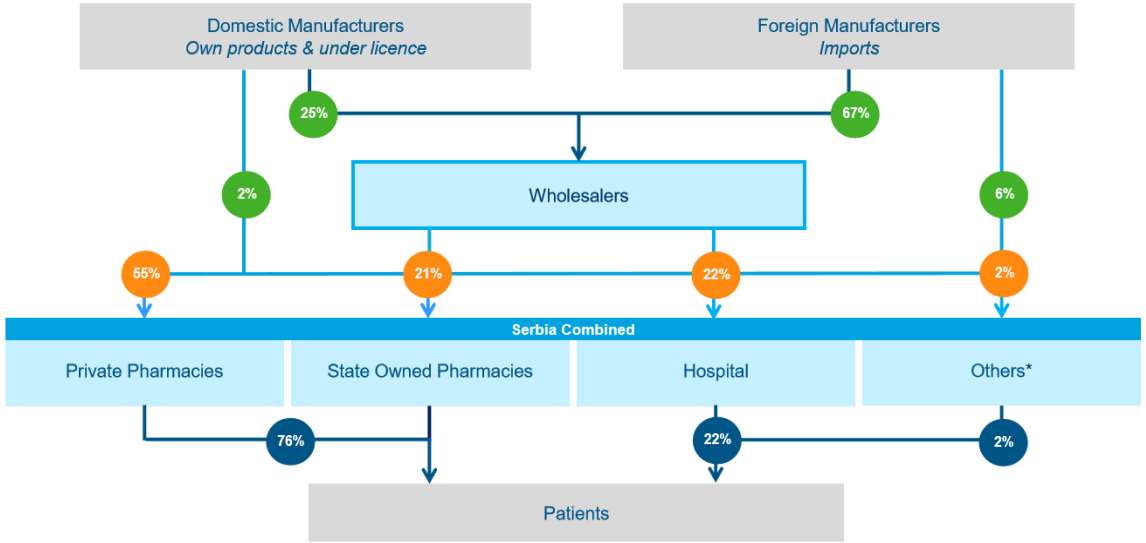




Outcomes

- Overall precision index improved by 1.7 percentage points in 2018
- Overall bias turned from 2.4% underestimation in 2017 to 3.4% overestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
34 *(no change vPY)*	**801** *(+253 vPY)*	**78%** *(+2% vPY)*

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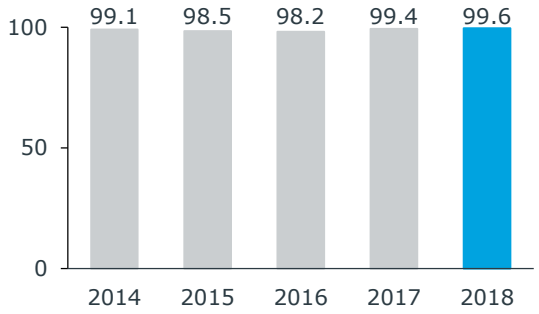
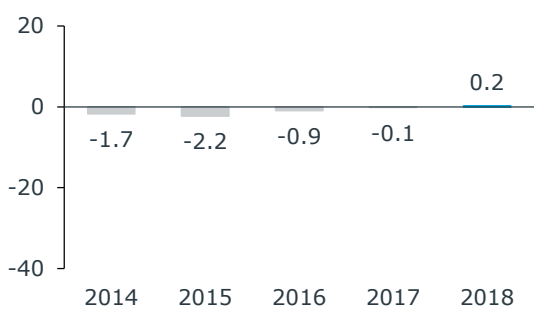
Slovakia Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	99.6%	Bias	0.2%

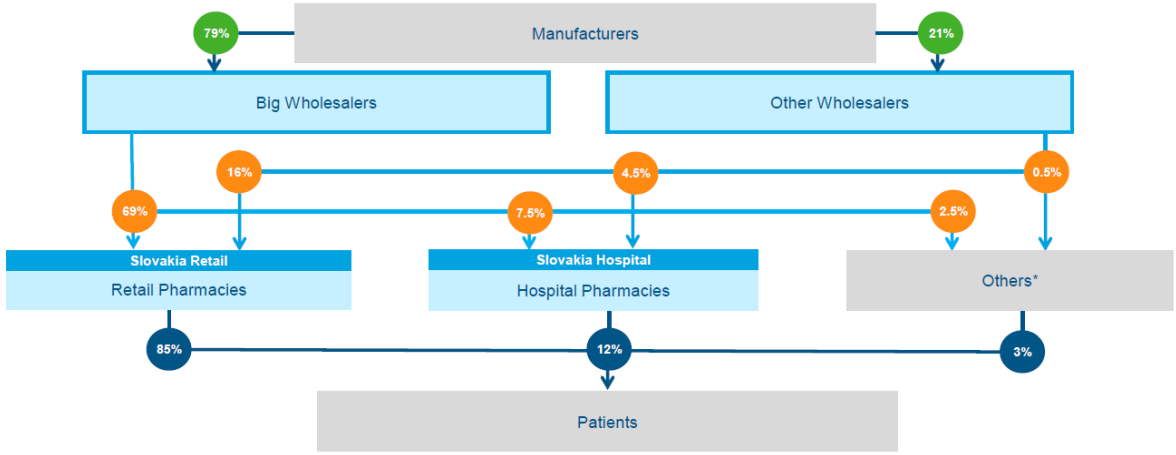




Outcomes

- Overall precision index improved by 0.2 percentage points in 2018
- Overall bias turned from 0.1% underestimation to 0.2% overestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
17 *(-2 vPY)*	**515** *(-186 vPY)*	**25%** *(-11% vPY)*

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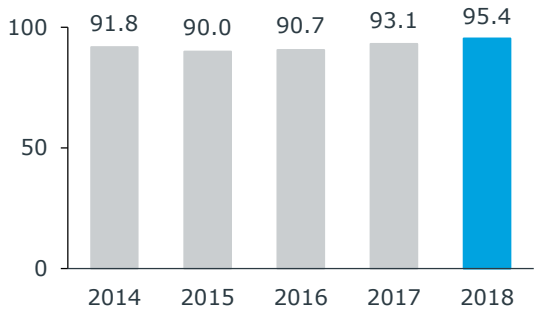
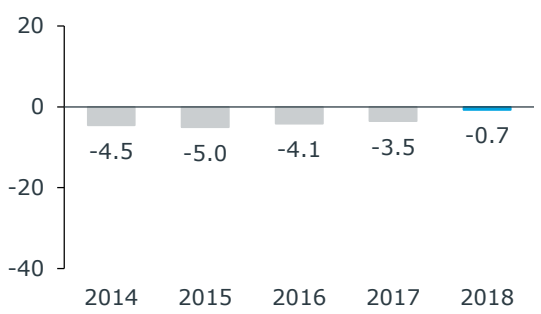
Slovakia PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	95.4%	Bias	-0.7%

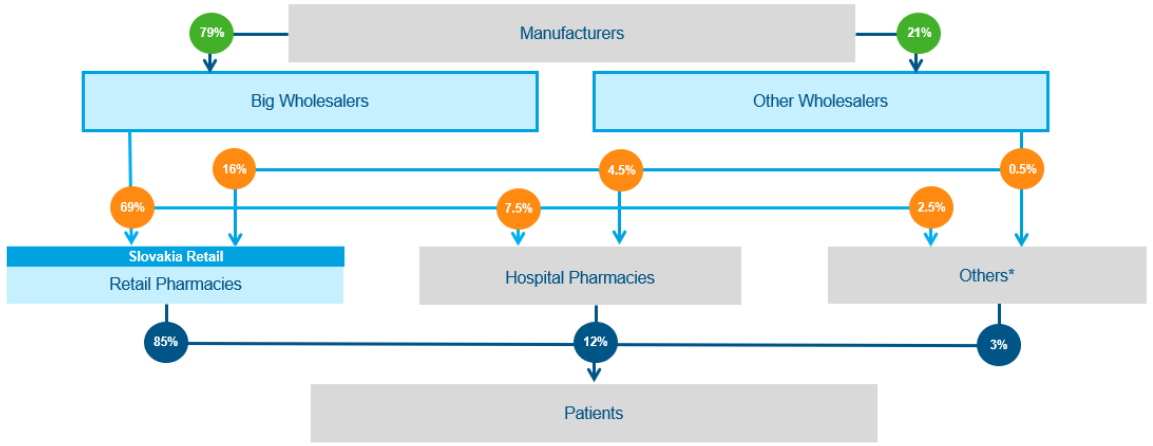




Outcomes

- Overall precision index improved by 2.3 percentage points in 2018
- Overall underestimation improved by 2.8 percentage points in 2018
- To improve projection methodology.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
16 *(-2 vPY)*	**441** *(-167 vPY)*	**12%** *(-6% vPY)*

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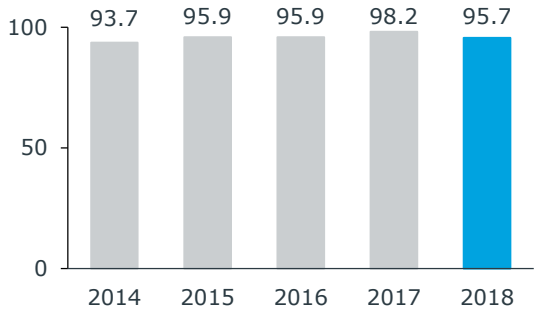
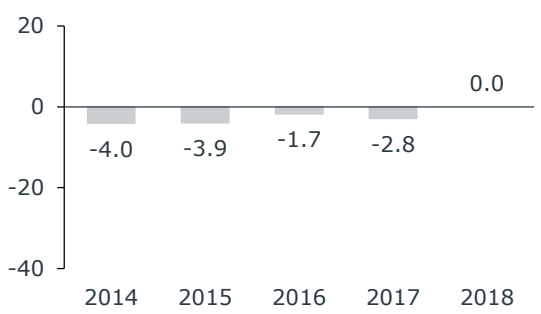
Slovakia OTC Validation Study

2018 Validation Study

Validation Results

Precision	95.7%	Bias	0.0%

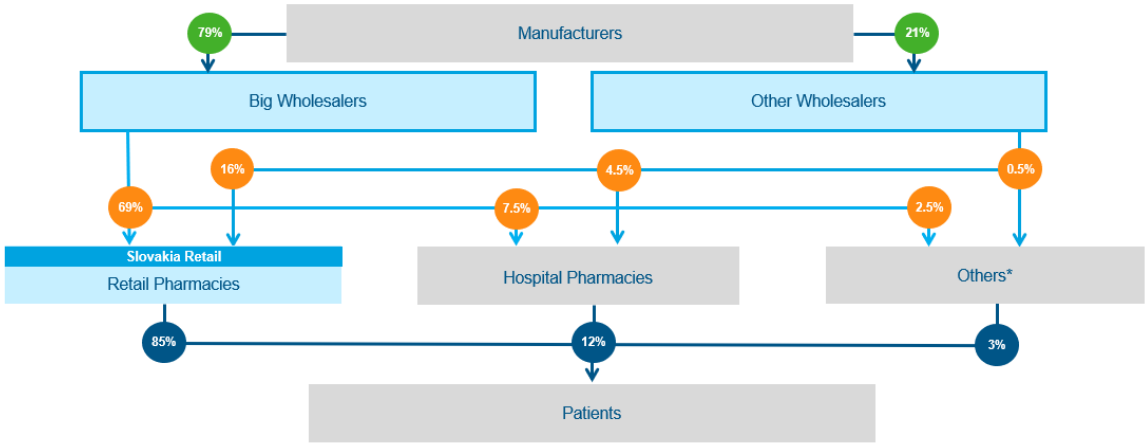




Outcomes

- Overall precision index declined by 2.5 percentage points in 2018
- Overall bias turned from 2.8% underestimation in 2017 to no bias in 2018
- To improve projection methodology.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
9 *(-2 vPY)*	**125** *(-36 vPY)*	**34%** *(-7% vPY)*

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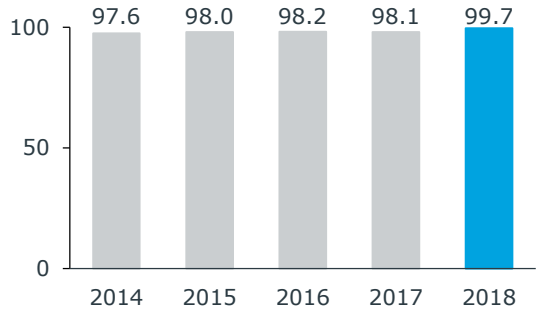
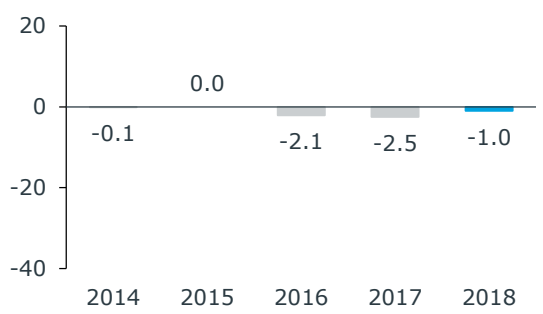
Slovenia Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	99.7%	Bias	-1.0%

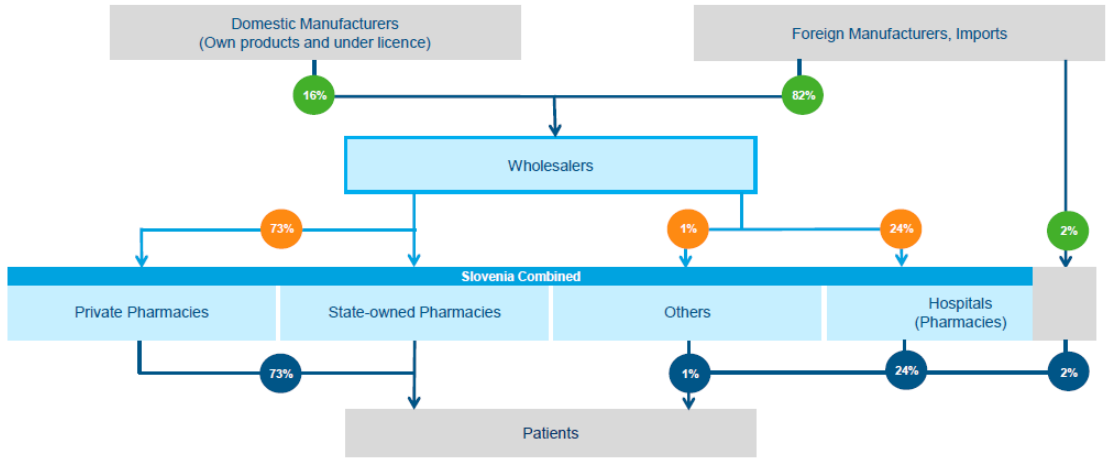




Outcomes

- Overall precision index improved by 1.6 percentage points in 2018
- Overall underestimation improved by 1.5 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
8 *(+1 vPY)*	**217** *(+88 vPY)*	**10%** *(+4% vPY)*

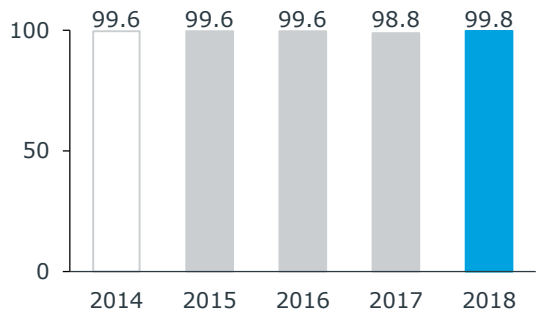
Back

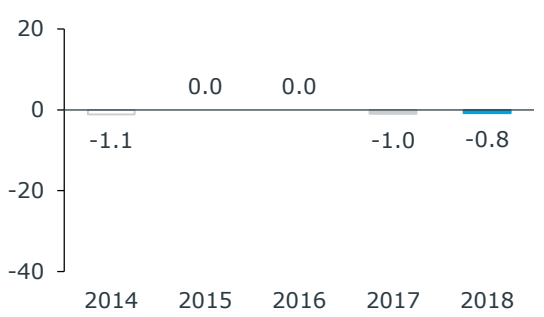
Switzerland Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	99.8%	Bias	-0.8%

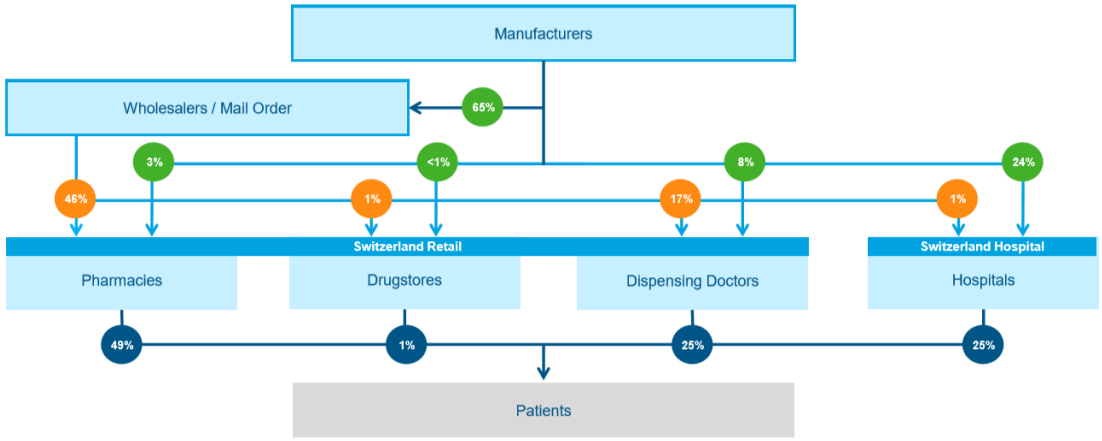




Outcomes

- Overall precision index improved by 1.0 percentage point in 2018
- Overall underestimation improved by 0.2 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
44 *(+5 vPY)*	**2,366** *(+674 vPY)*	**55%** *(+17% vPY)*

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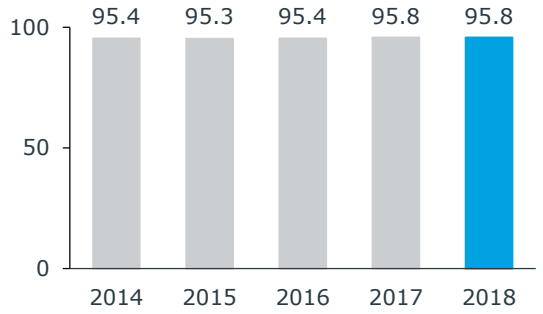
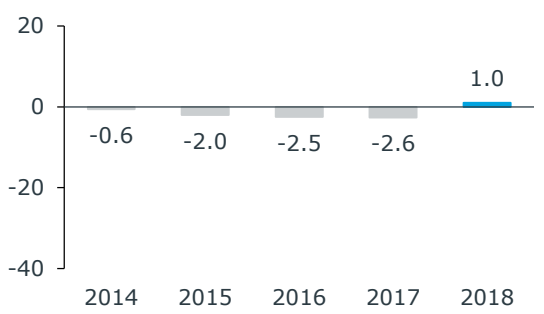
Switzerland PharmaTrend Validation Study

2018 Validation Study

Validation Results

Precision	95.8%	Bias	1.0%

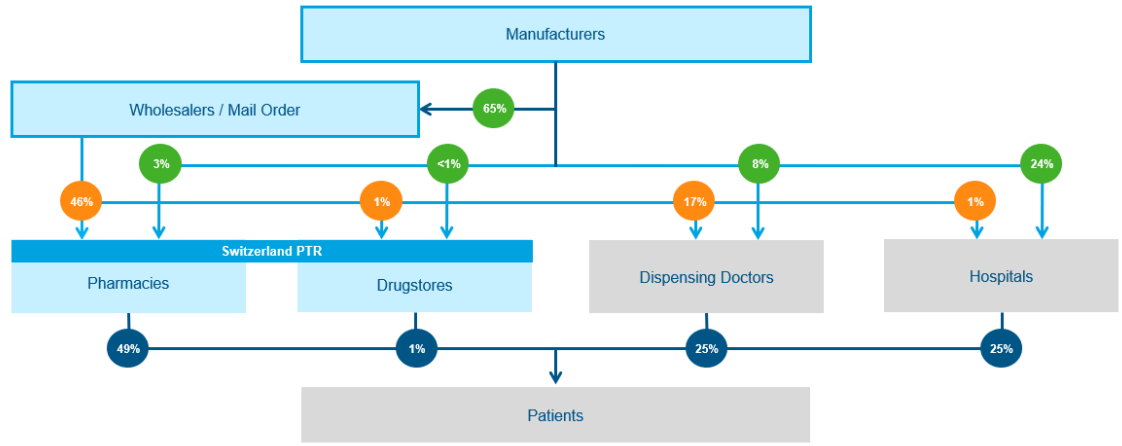




Outcomes

- Overall precision index remained unchanged in 2018
- Overall bias turned from 2.6% underestimation in 2017 to 1.0% overestimation in 2018
- To review projection level to further improve precision.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
172 *(-2 vPY)*	**3,059** *(+44 vPY)*	**89%** *(no change vPY)*

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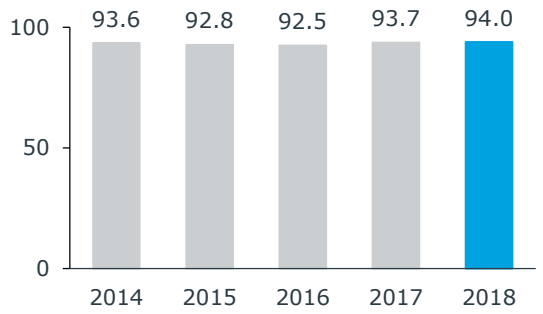
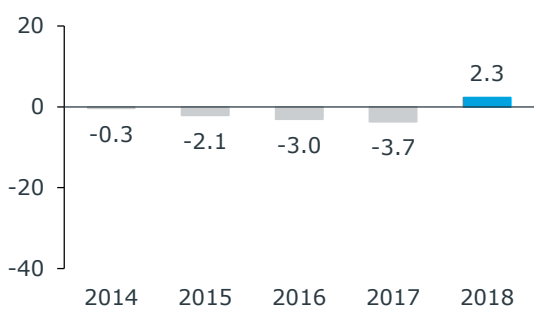
Switzerland OTC Validation Study

2018 Validation Study

Validation Results

Precision	94.0%	Bias	2.3%

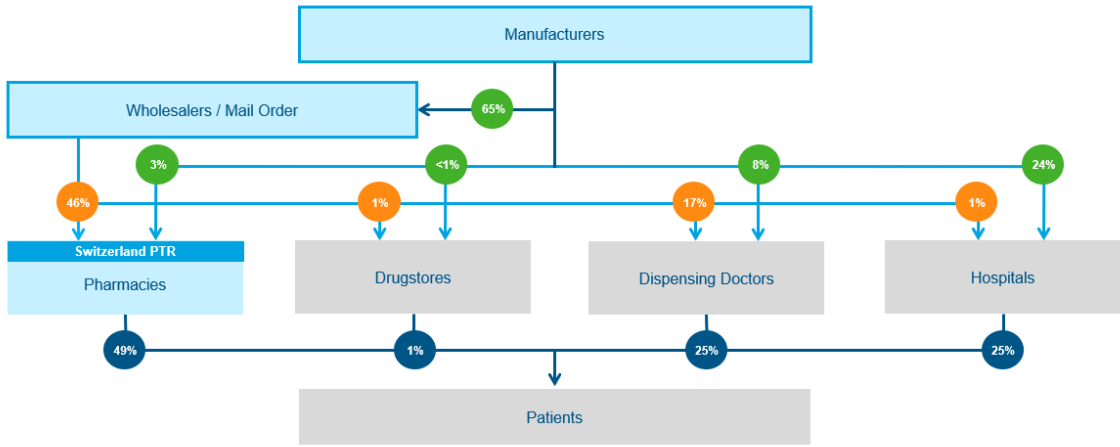




Outcomes

- Overall precision index improved by 0.3 percentage points in 2018
- Overall bias turned from 3.7% underestimation in 2017 to 2.3% overestimation in 2018
- To review projection level to further improve precision.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
111 *(+1 vPY)*	**1,116** *(+5 vPY)*	**81%** *(+5% vPY)*

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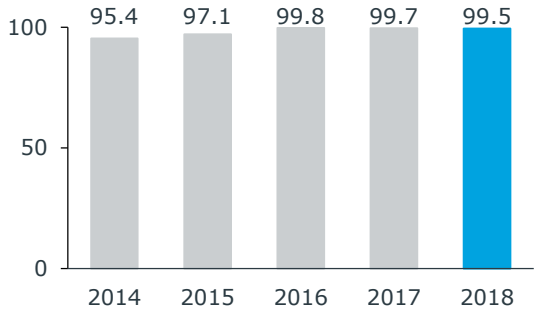
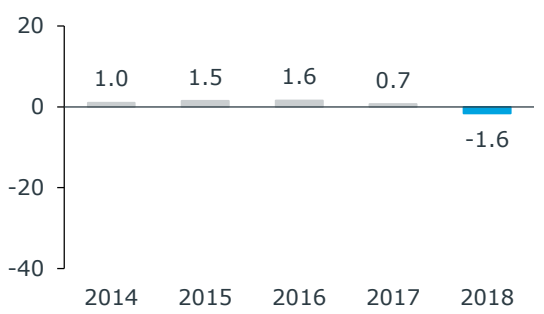
United Kingdom Retail Validation Study

2018 Validation Study

Validation Results

Precision	99.5%	Bias	-1.6%

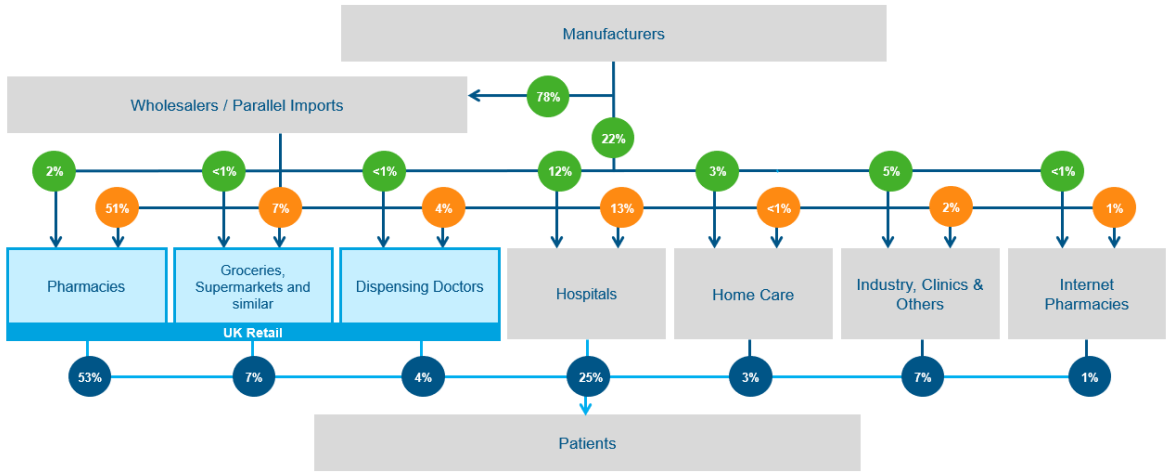




Outcomes

- Overall precision index declined by 0.2 percentage points in 2018
- Overall bias turned from 0.7 overestimation to 1.6 underestimation in 2018
- Replatforming to new technology which will allow for improved business rules and projection method.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
55 *(+7 vPY)*	**314** *(+42 vPY)*	**20%** *(+1% vPY)*

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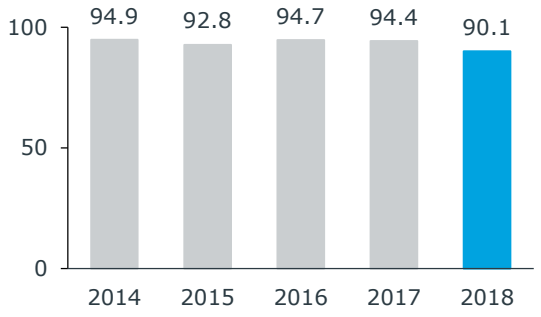
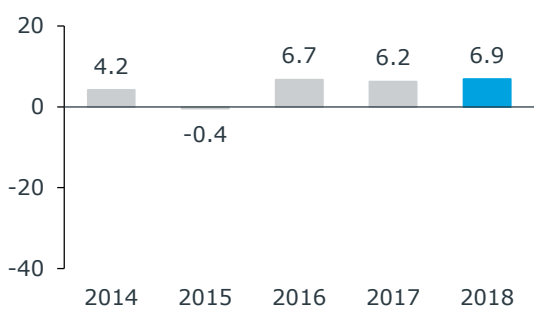
United Kingdom Hospital Validation Study

2018 Validation Study

Validation Results

Precision	90.1%	Bias	6.9%

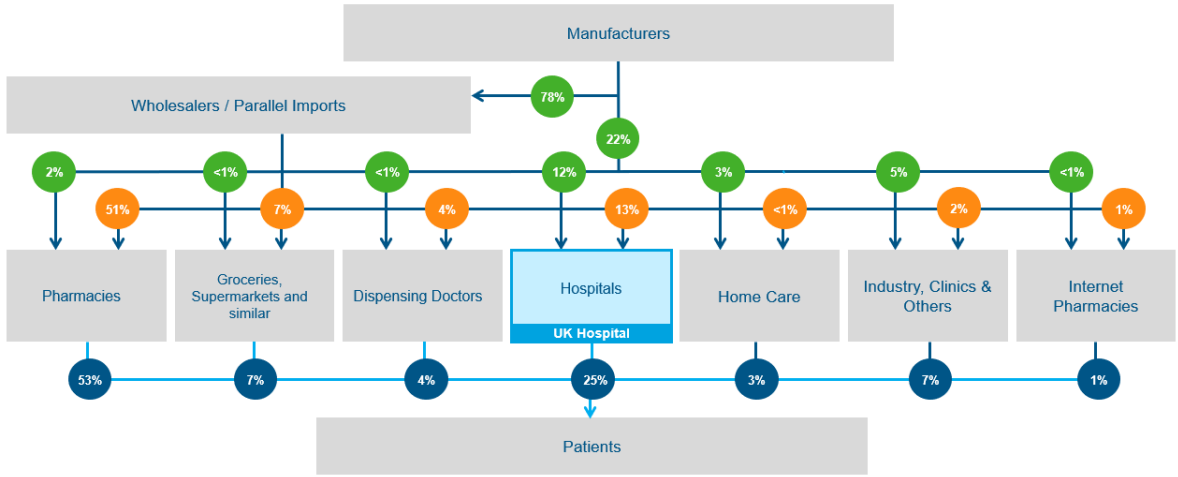




Outcomes

- Overall precision index declined by 4.3 percentage points in 2018
- Overall overestimation increased by 0.7 percentage points in 2018
- Continue to improve the panel and inclusion of outpatient outsourced pharmacies and additional homecare data.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
73 *(+8 vPY)*	**453** *(+50 vPY)*	**17%** *(+4% vPY)*

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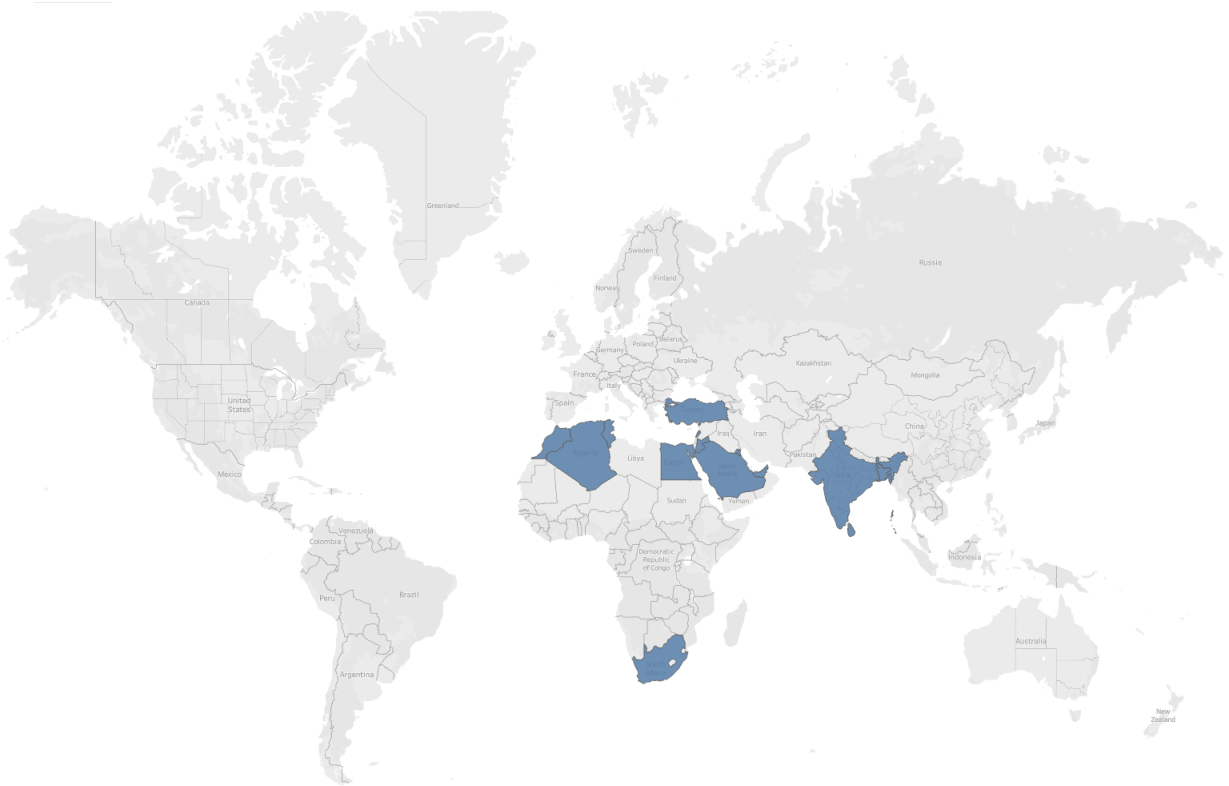
Africa, Middle East, South Asia



Countries	
Africa	**Middle East**
• Algeria	• Egypt
• Morocco	• Jordan
• South Africa	• Kuwait
• Tunisia	• Lebanon
	• Saudi Arabia
South Asia	• South Africa
• Bangladesh	• Turkey
• India	• United Arab Emirates
• Sri Lanka	

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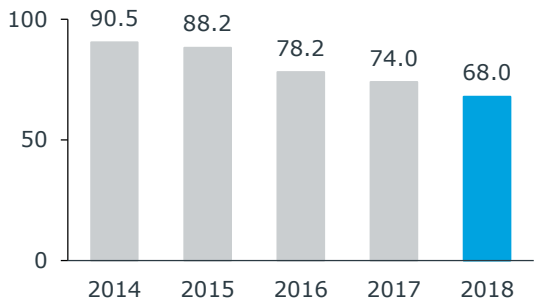
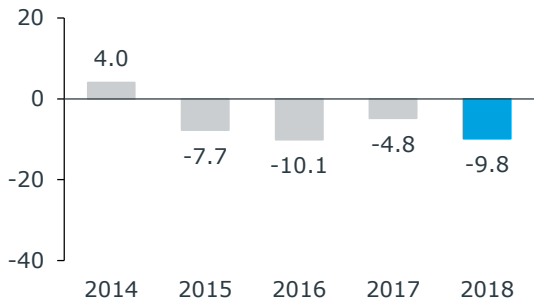
Algeria Retail Validation Study

2018 Validation Study

Validation Results

Precision	68.0%	Bias	-9.8%

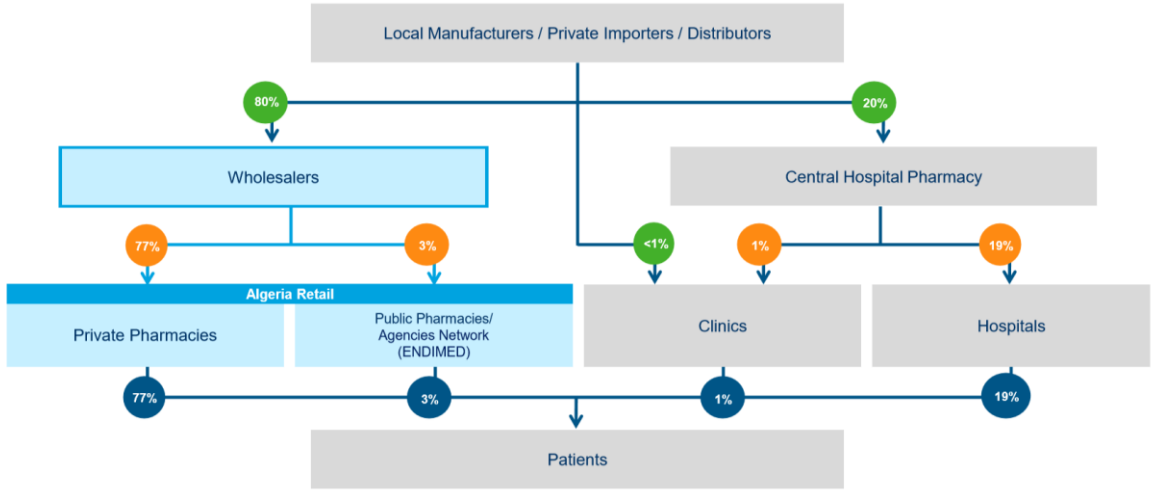




Outcomes

- Overall precision index declined by 6.0 percentage points in 2018
- Overall underestimation increased by 5.0 percentage points in 2018
- To evaluate panel representativeness and adjust projection level

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
22 *(-8 vPY)*	**447** *(-97 vPY)*	**36%** *(-11% vPY)*

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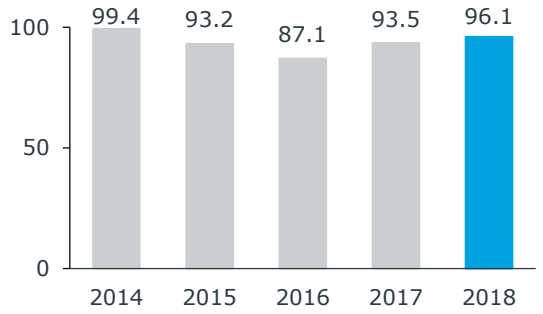
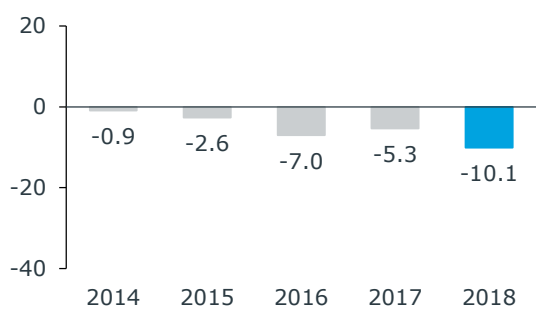
Morocco Retail Validation Study

2018 Validation Study

Validation Results

Precision	96.1%	Bias	-10.1%

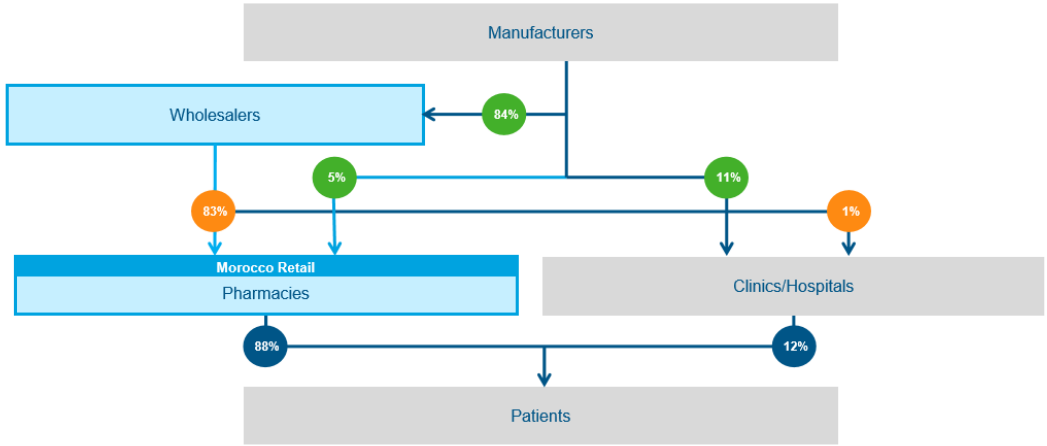




Outcomes

- Overall precision index improved by 2.6 percentage points in 2018
- Overall underestimation increased by 4.8 percentage points in 2018
- To analyze direct sales projection frame and review quality control mechanisms to improve further

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
46 *(+10 vPY)*	**436** *(+34 vPY)*	**26%** *(no change vPY)*

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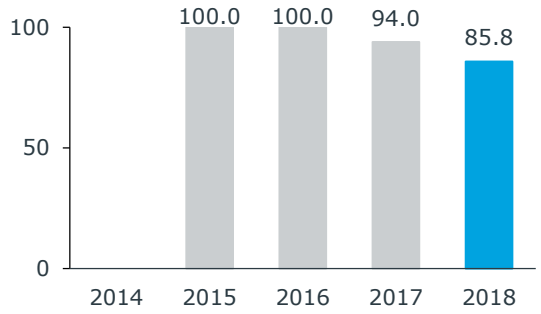
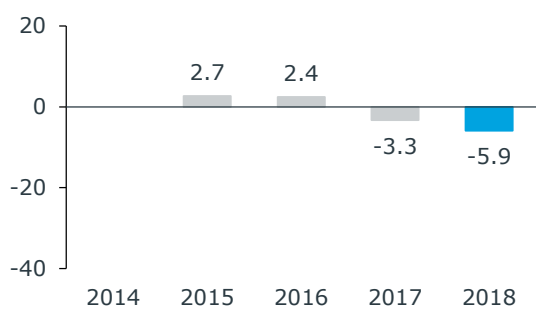
South Africa Total Private Market Validation Study

2018 Validation Study

Validation Results

Precision	85.8%	Bias	-5.9%

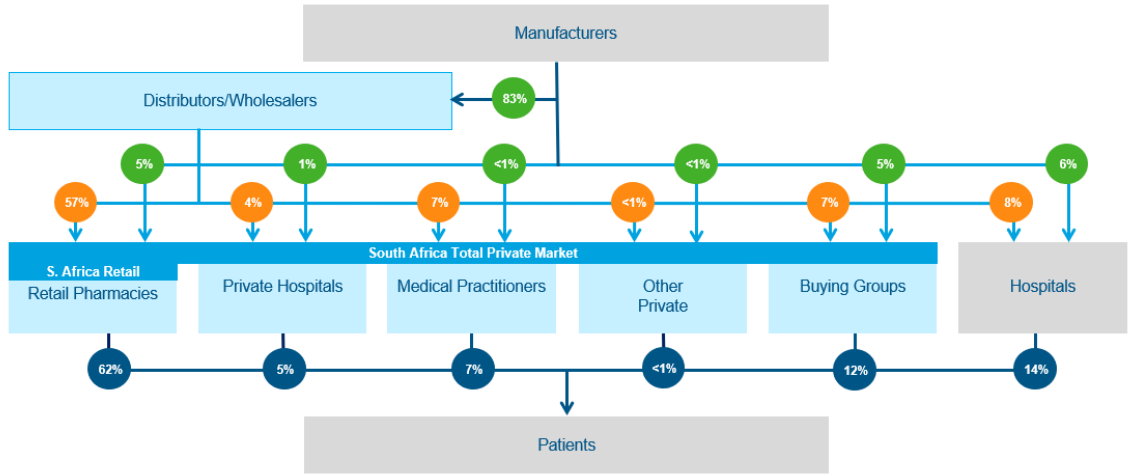




Outcomes

- Overall precision index declined by 8.2 percentage points in 2018
- Overall underestimation increased by 2.6 percentage points in 2018
- To investigate quality of input data is required from a statistical point of view

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
30 *(+6 vPY)*	**1,062** *(+30 vPY)*	**24%** *(+2% vPY)*

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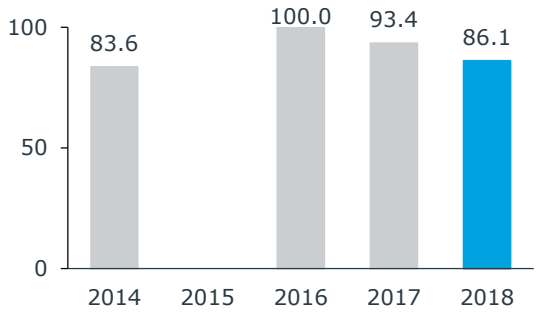
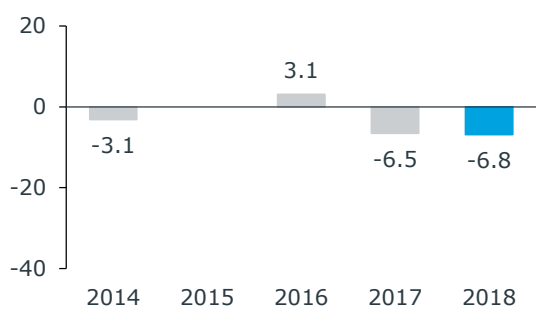
South Africa OTC Validation Study

2018 Validation Study

Validation Results

Precision	86.1%	Bias	-6.8%

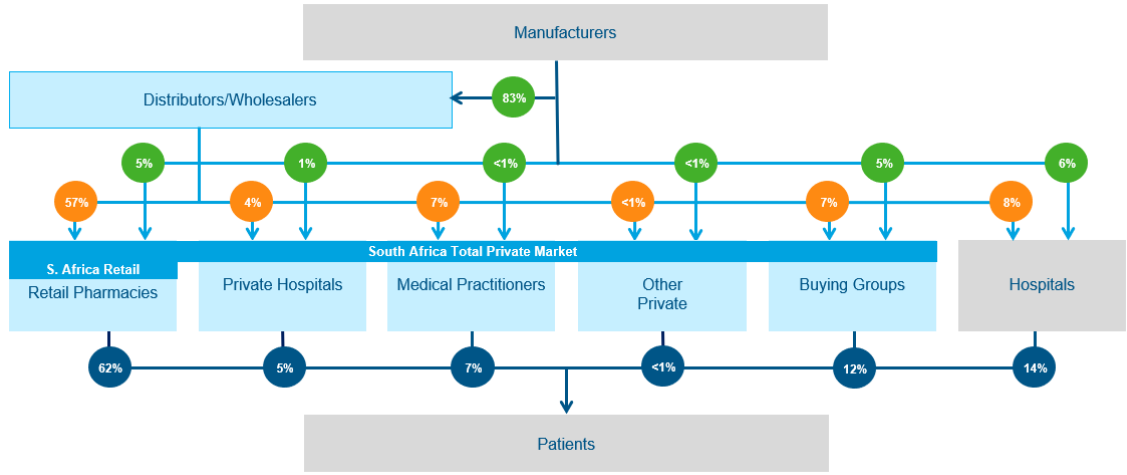




Outcomes

- Overall precision index declined by 7.3 percentage points in 2018
- Overall underestimation increased by 0.3 percentage points in 2018
- Investigate quality of input data

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
23 *(+4 vPY)*	**327** *(+67 vPY)*	**18%** *(+8% vPY)*

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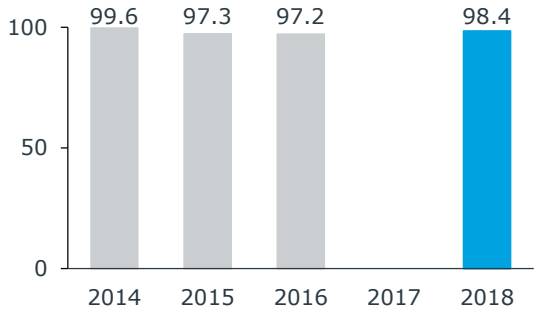
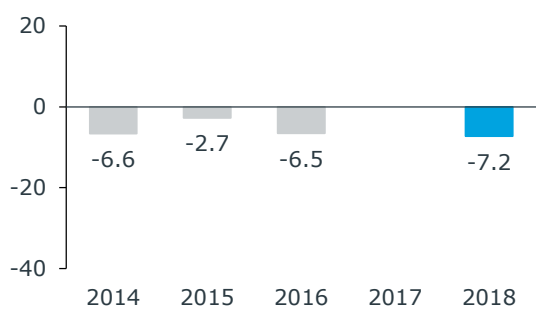
Tunisia Retail Validation Study

2018 Validation Study

Validation Results

Precision	98.4%	Bias	-7.2%

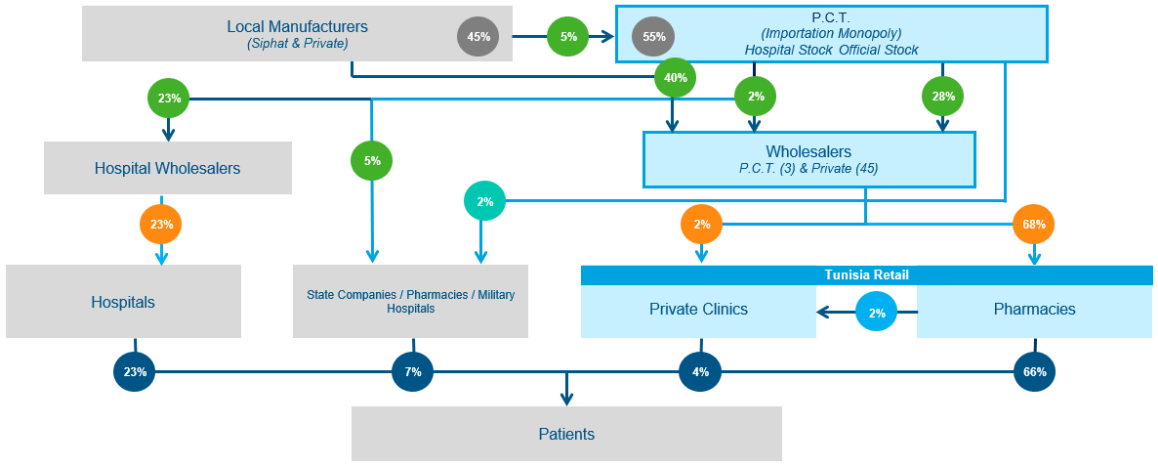




Outcomes

- Overall precision index improved by 1.2 percentage points in 2018
- Overall underestimation increased by 0.7 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
26 *(-1 v2016)*	**819** *(+15 v2016)*	**53%** *(-5% v2016)*

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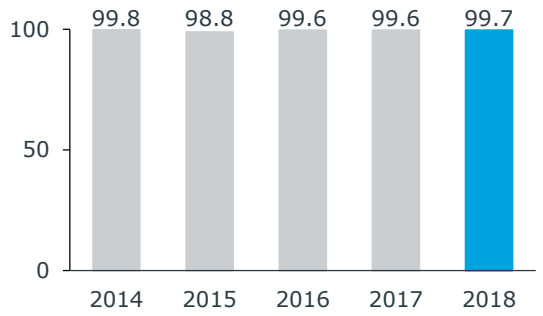
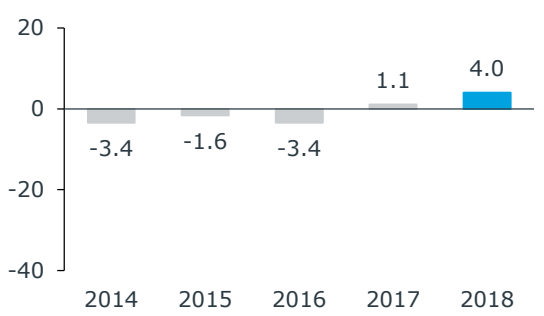
Egypt Retail Validation Study

2018 Validation Study

Validation Results

Precision	99.7%	Bias	4.0%

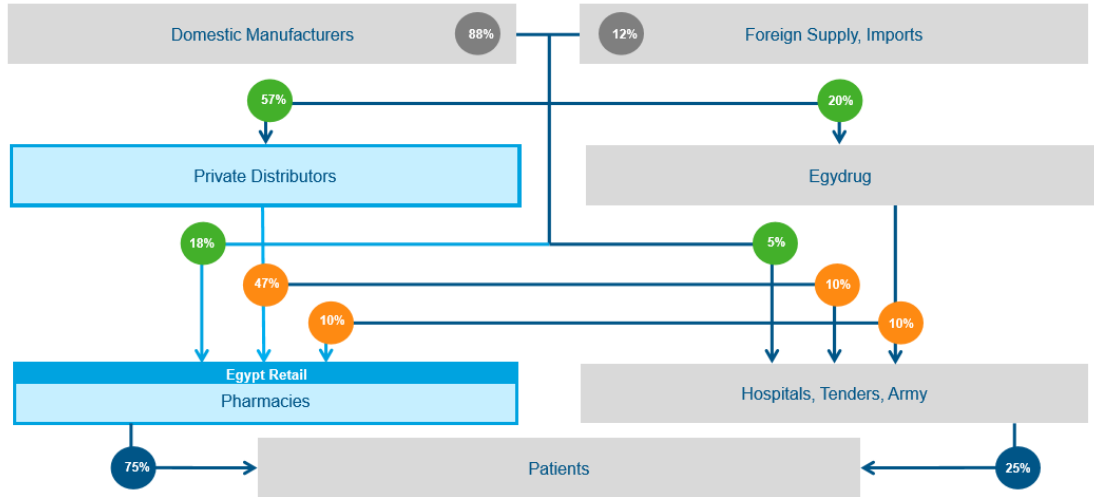




Outcomes

- Overall precision index improved by 0.1 percentage points in 2018
- Overall overestimation increased by 2.9 percentage points in 2018
- No action required from the statistical point of view

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
26 *(-3 vPY)*	**352** *(-49 vPY)*	**17%** *(+1% vPY)*

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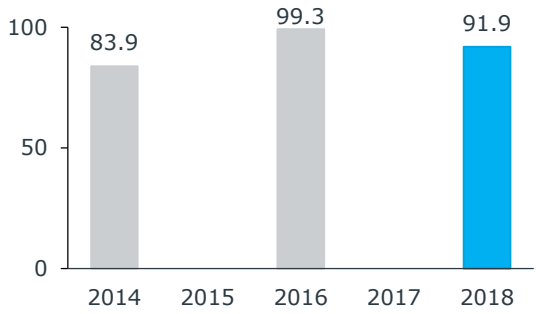
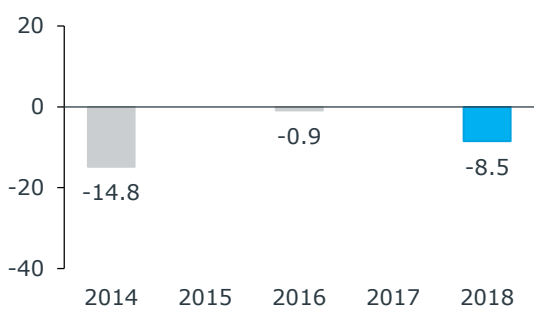
Jordan Retail Validation Study

2018 Validation Study

Validation Results

Precision	91.9%	Bias	-8.5%

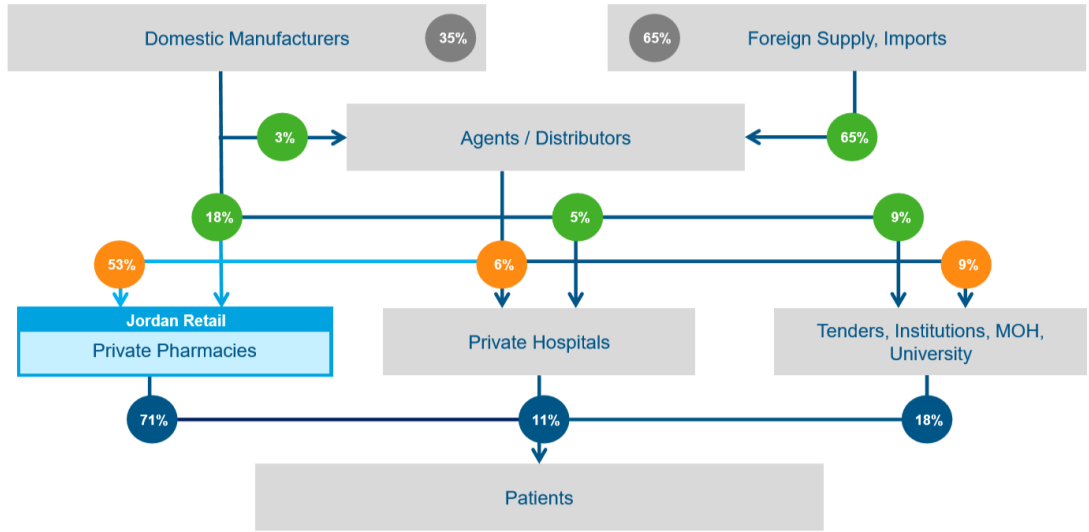




Outcomes

- Overall precision index declined by 7.4 percentage points in 2018
- Overall underestimation increased by 7.6 percentage points in 2018
- To motivate more companies to participate in the validation study, consider use of pharmacy chain data and review projection level.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
7 *(-6 v2016)*	**272** *(+26 v2016)*	**15%** *(-3% v2016)*

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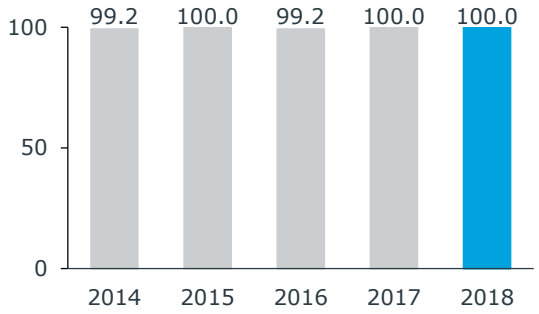
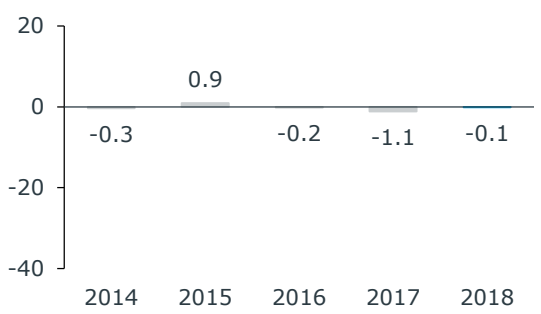
Kuwait Retail Validation Study

2018 Validation Study

Validation Results

Precision	100.0%	Bias	-0.1%

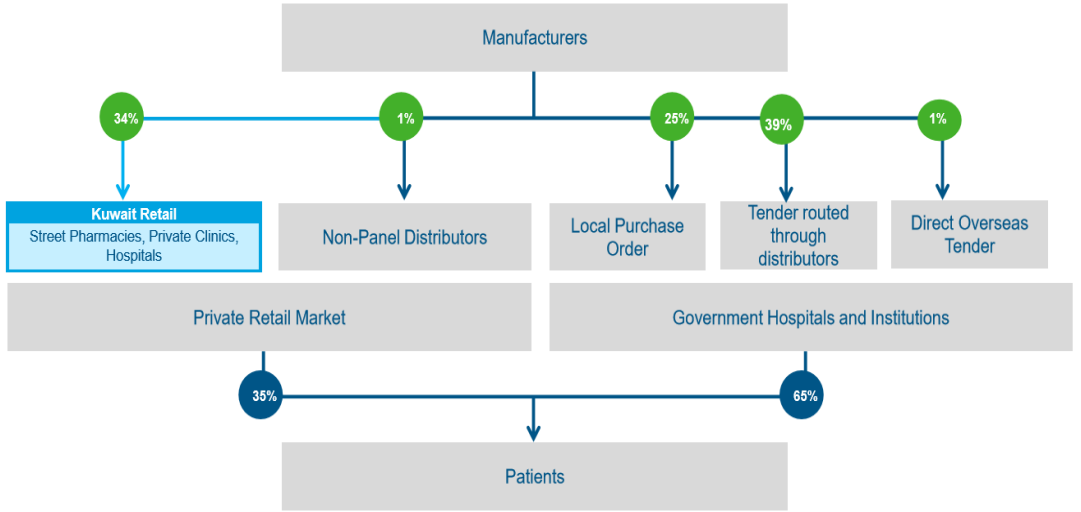




Outcomes

- Overall precision index keep 100 percentage points in 2018
- Overall underestimation improved by 1.0 percentage point in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
12 *(-4 vPY)*	**273** *(-21 vPY)*	**21%** *(-2% vPY)*

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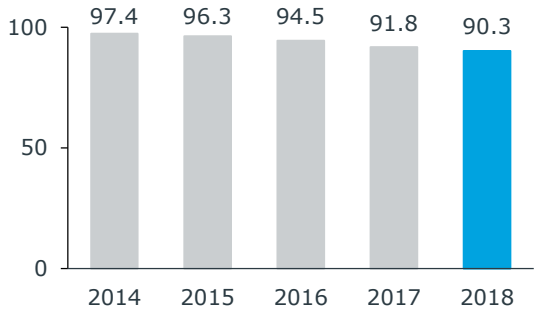
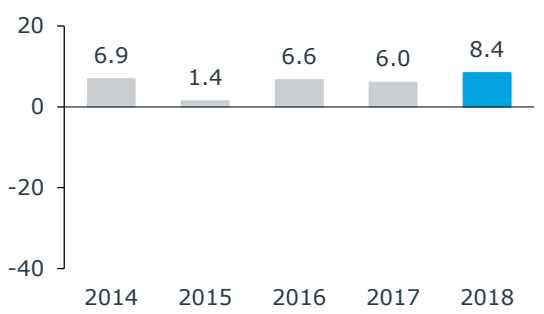
Lebanon Retail Validation Study

2018 Validation Study

Validation Results

Precision	90.3%	Bias	8.4%

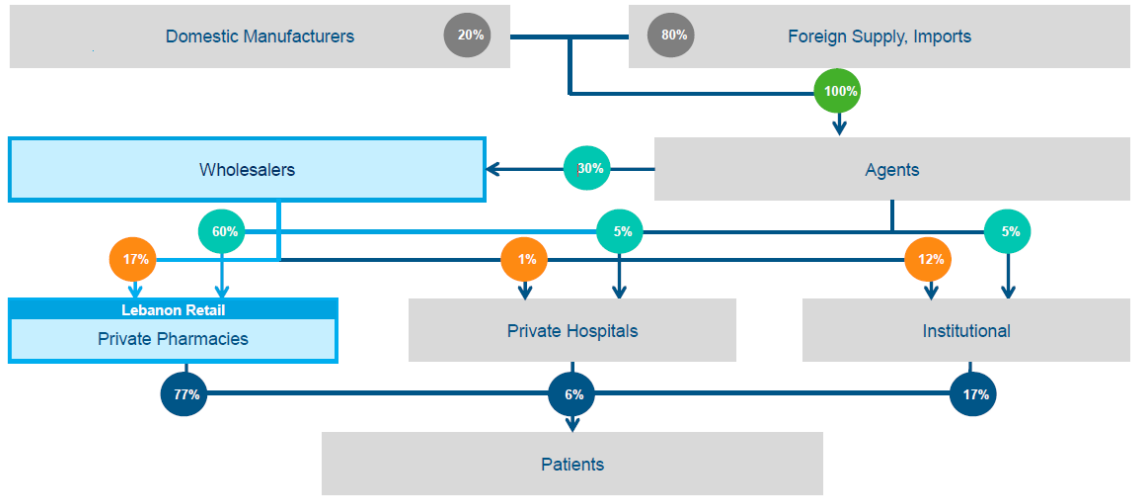




Outcomes

- Overall precision index declined by 1.5 percentage points in 2018
- Overall overestimation increased by 2.4 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(+5 vPY)*	**354** *(+213 vPY)*	**15%** *(+8% vPY)*

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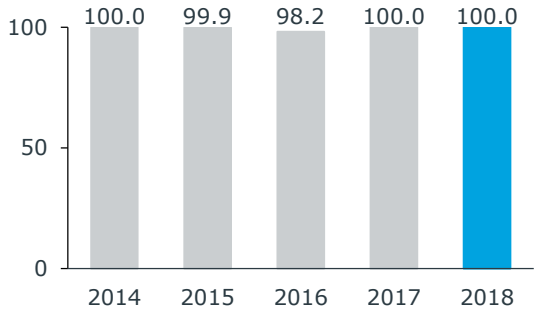
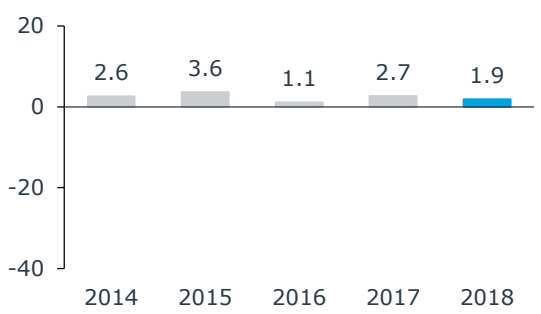
Saudi Arabia Retail Validation Study

2018 Validation Study

Validation Results

Precision	100.0%	Bias	1.9%

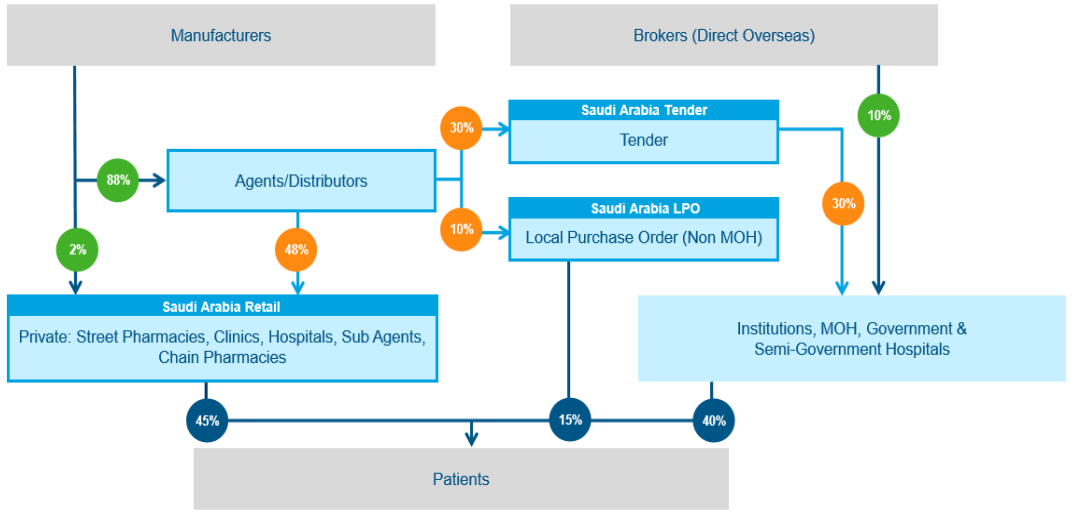




Outcomes

- Overall precision index remained unchanged at 100 percentage points in 2018
- Overall overestimation improved by 0.8 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
97 *(+9 vPY)*	**1145** *(+65 vPY)*	**74%** *(+3% vPY)*

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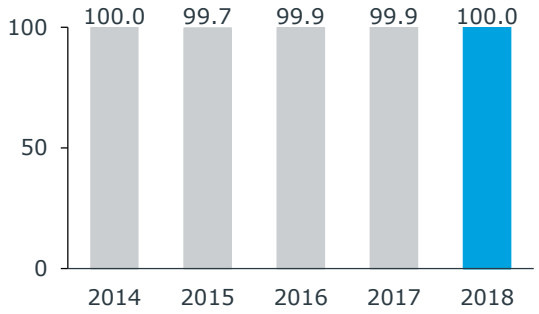
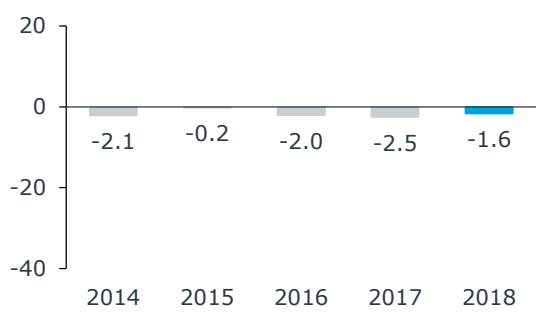
Turkey Retail Validation Study

2018 Validation Study

Validation Results

Precision	100%	Bias	-1.6%

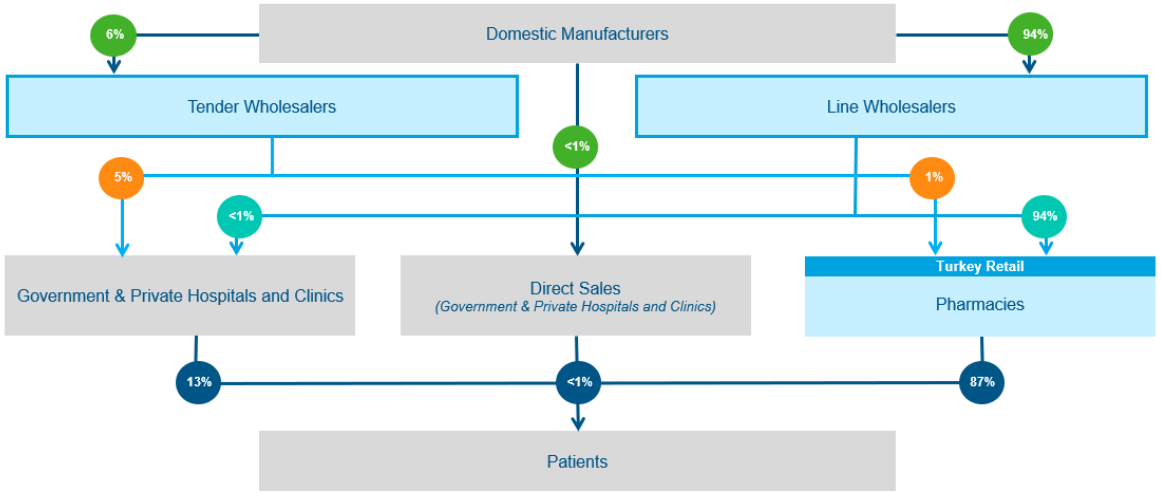




Outcomes

- Overall precision index improved by 0.1 percentage points in 2018
- Overall underestimation improved by 0.9 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
60 *(-19 vPY)*	**1,132** *(-344 vPY)*	**51%** *(-9% vPY)*

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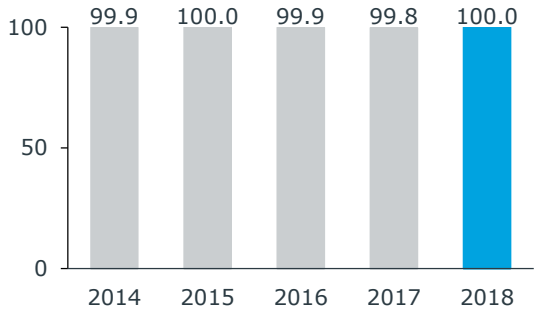
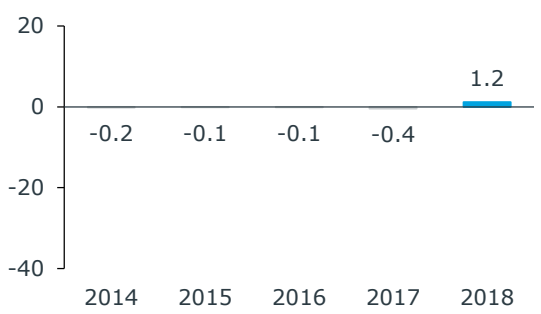
United Arab Emirates Retail Validation Study

2018 Validation Study

Validation Results

Precision	100.0%	Bias	1.2%

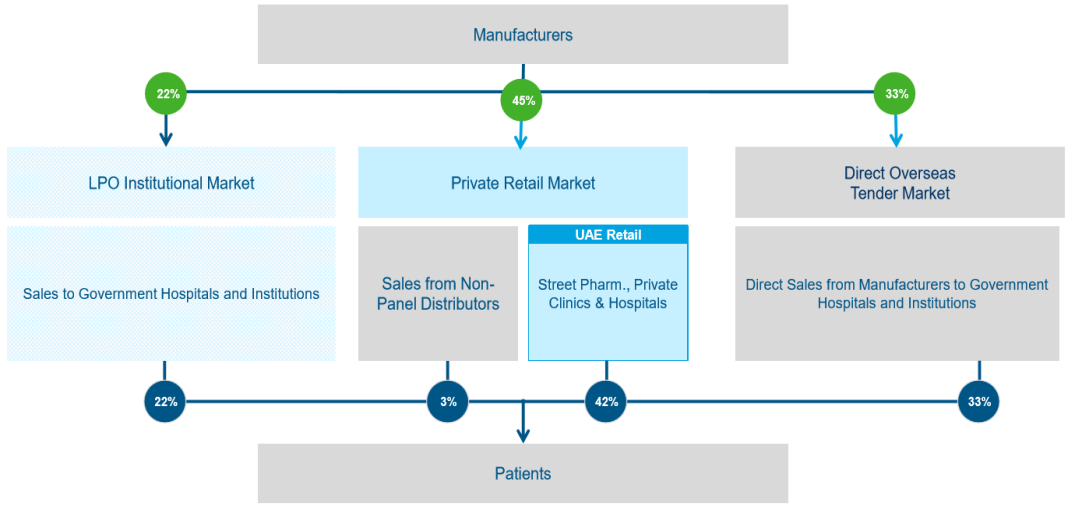




Outcomes

- Overall precision index improved by 0.2 percentage points in 2018
- Overall bias turned from 0.4% underestimation in 2017 to 1.2% overestimation in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
19 *(-6 vPY)*	**494** *(-231 vPY)*	**19%** *(-22% vPY)*

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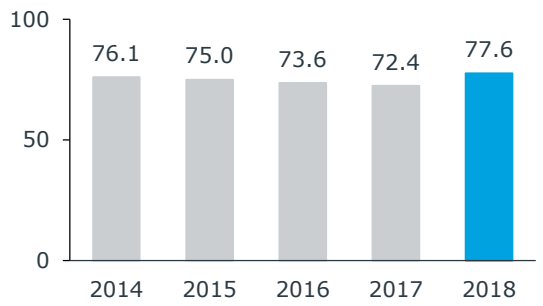
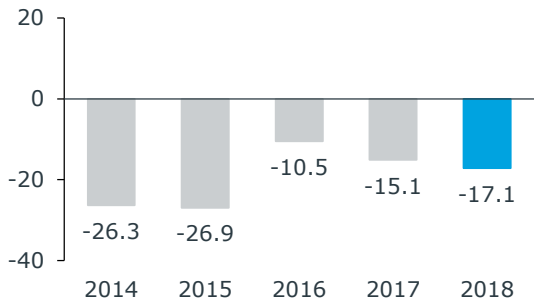
Bangladesh Retail Validation Study

2018 Validation Study

Validation Results

Precision	77.6%	Bias	-17.1%

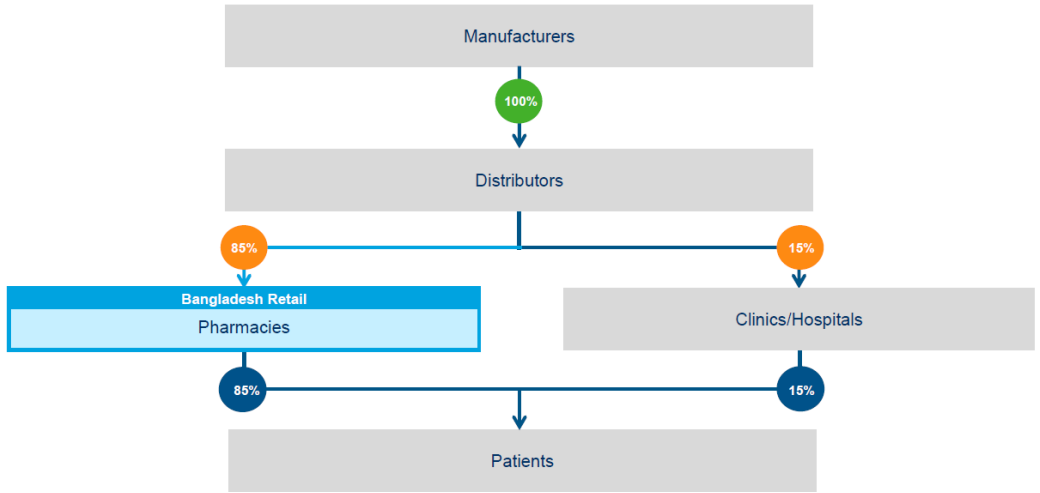




Outcomes

- Overall precision index improved by 5.2 percentage points in 2018
- Overall underestimation increased by 2.0 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
12 *(no change vPY)*	**1,593** *(-609 vPY)*	**34%** *(-16% vPY)*

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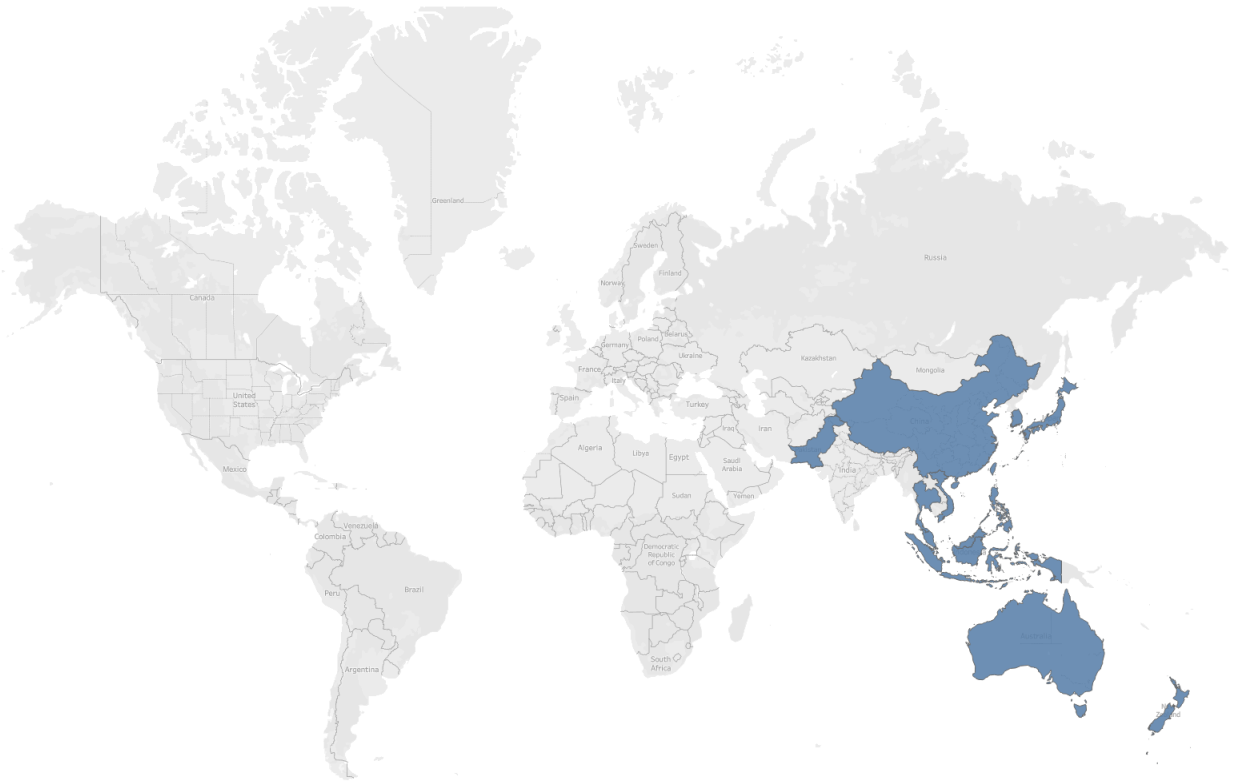
Asia Pacific



Regions / Countries	
Greater China	**Southeast Asia**
• China	• Indonesia
• Hong Kong	• Malaysia
• Taiwan	• Pakistan
	• Philippines
Pacific Asia	• Singapore
• South Korea	• Thailand
• Japan	• Vietnam
• Australia	
• New Zealand	

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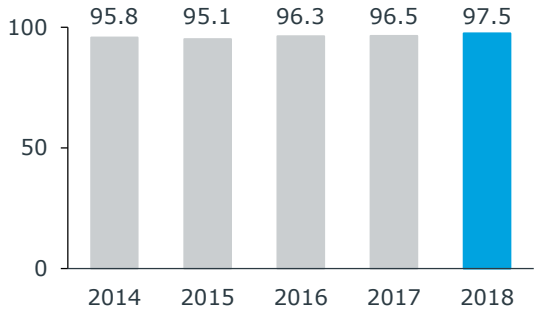
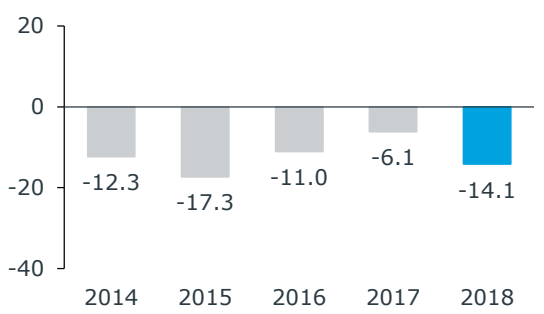
China Hospital Validation Study

2018 Validation Study

Validation Results

Precision	97.5%	Bias	-14.1%

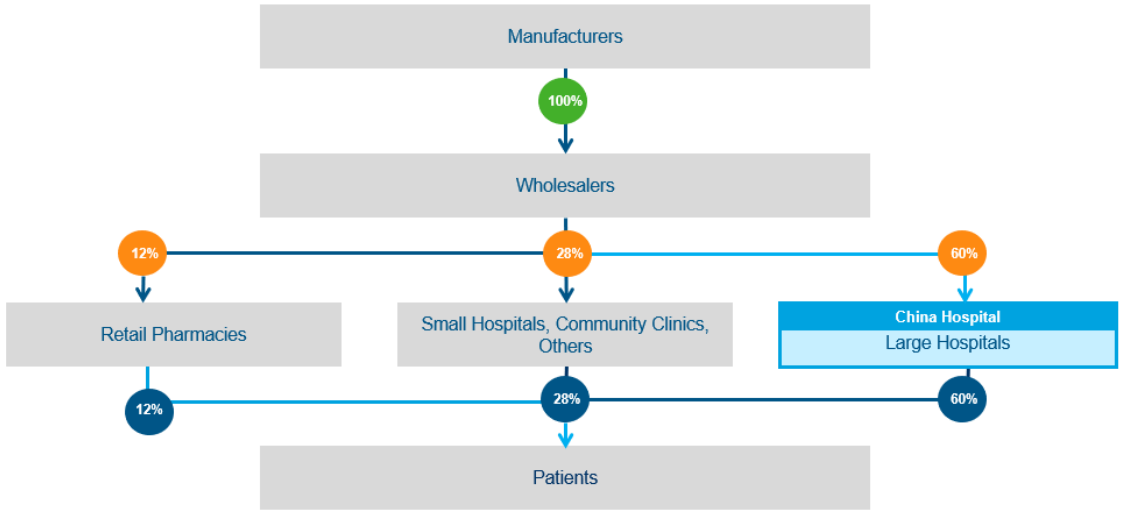




Outcomes

- Overall precision index improved by 1 percentage point in 2018
- Overall underestimation increased by 8.0 percentage points in 2018
- To update universe and panel adjust projection method, evaluate alternative data sources long-term

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
21 *(-4 vPY)*	**130** *(-39 vPY)*	**1%** *(-2% vPY)*

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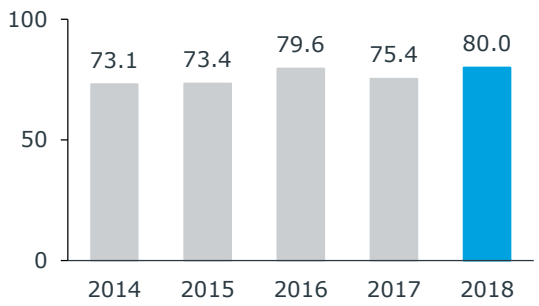
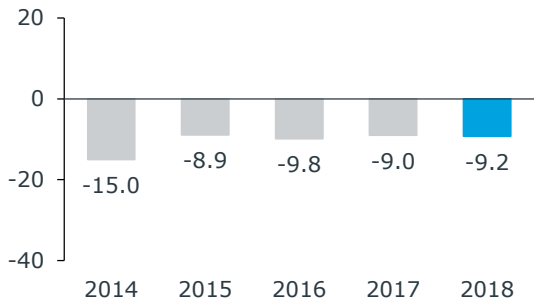
Hong Kong Retail Validation Study

2018 Validation Study

Validation Results

Precision	80.0%	Bias	-9.2%

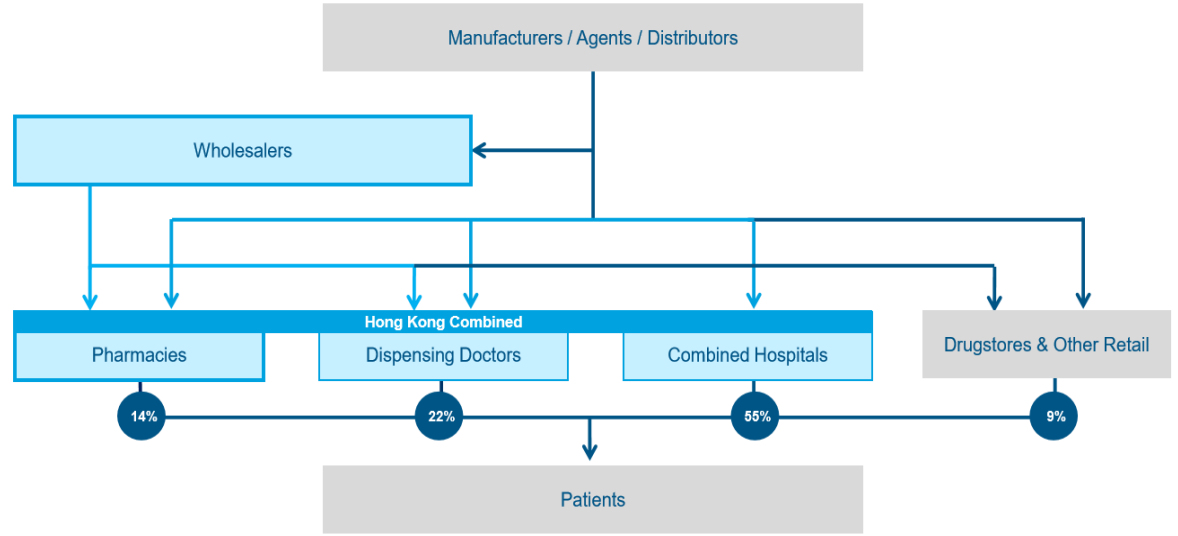




Outcomes

- Overall precision index improved by 4.6 percentage points in 2018
- Overall underestimation increased by 0.2 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
37 *(-1 vPY)*	**762** *(+43 vPY)*	**30%** *(+4% vPY)*

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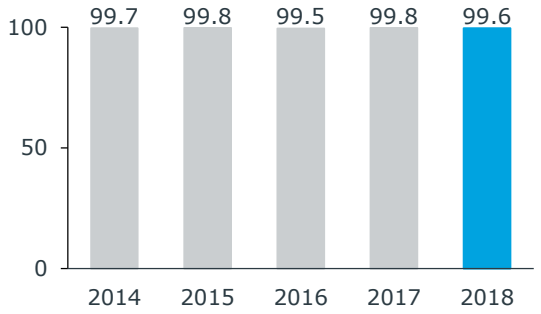
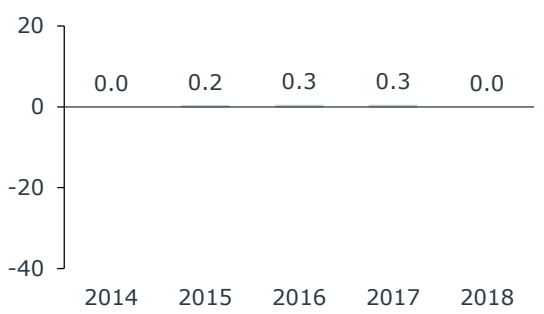
Japan Retail+Hospital Validation Study

2018 Validation Study

Validation Results

Precision	99.6%	Bias	0.0%

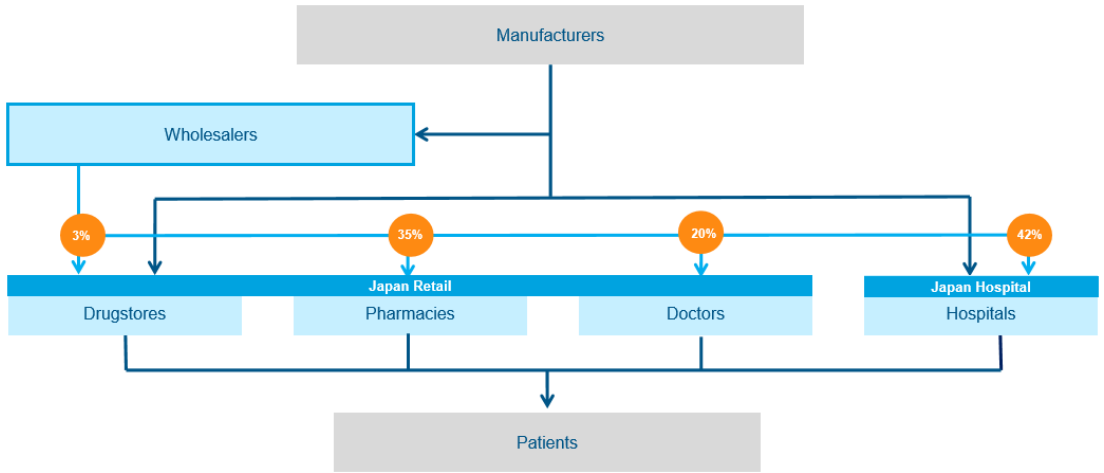




Outcomes

- Overall precision index declined by 0.2 percentage points in 2018
- Overall underestimation improved by 0.3 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
50 *(+8 vPY)*	**3,013** *(+203 vPY)*	**45%** *(no change vPY)*

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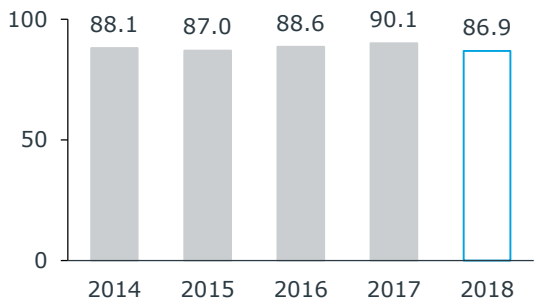
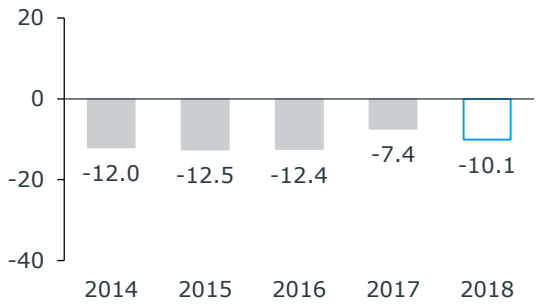
South Korea Retail Validation Study

2018 Validation Study

Validation Results

Precision	86.9%	Bias	-10.1%

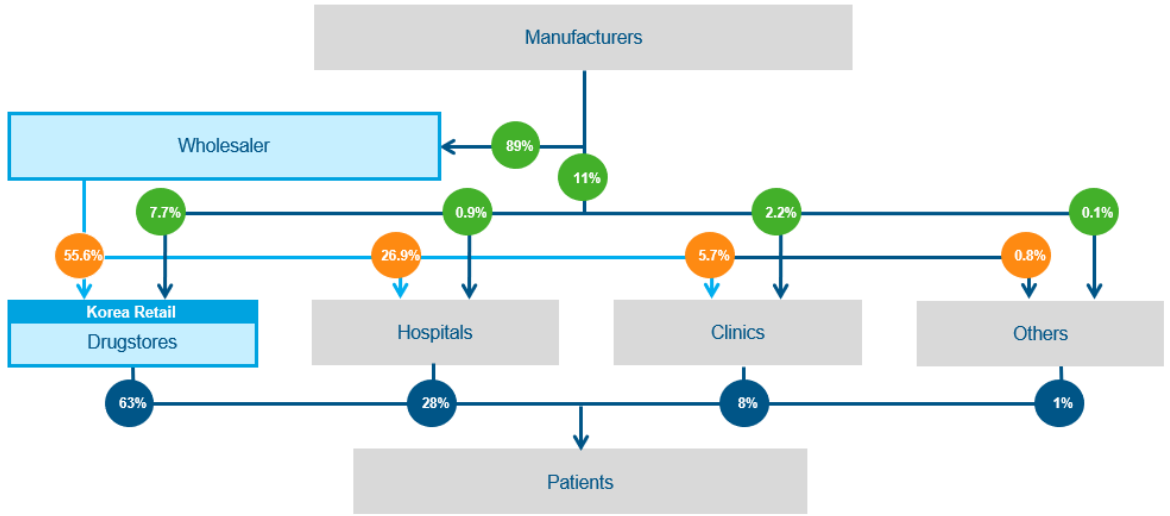




Outcomes

- Overall precision index declined by 3.2 percentage points in 2018
- Overall underestimation increased by 2.7 percentage points in 2018
- Review projection level and panel composition, check completeness and accuracy of panel data and replace inadequate panel.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(+2 vPY)*	**364** *(-78 vPY)*	**8%** *(-2% vPY)*

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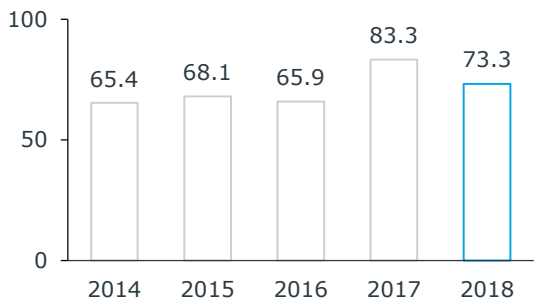
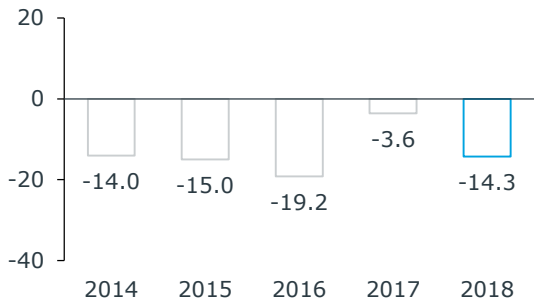
South Korea OTC Validation Study

2018 Validation Study

Validation Results

Precision	73.3%	Bias	-14.3%

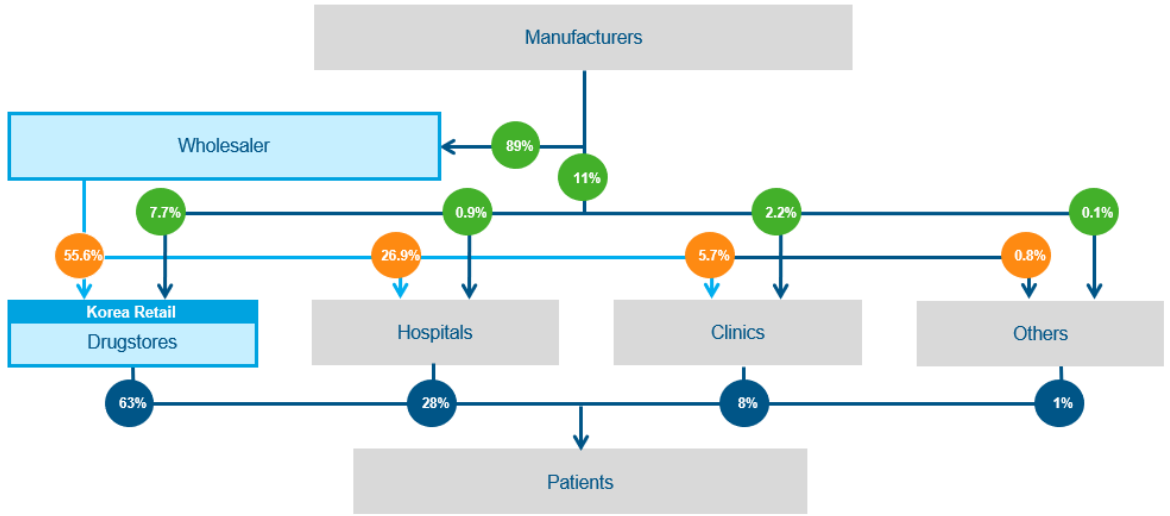




Outcomes

- Overall precision index declined by 10 percentage points in 2018
- Overall underestimation increased by 10.7 percentage points in 2018
- Review projection level and panel composition, check completeness and accuracy of panel data and replace inadequate panel

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
6 *(no change vPY)*	**30** *(-25 vPY)*	**2%** *(-1% vPY)*

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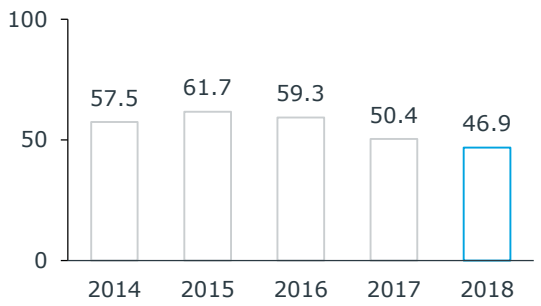
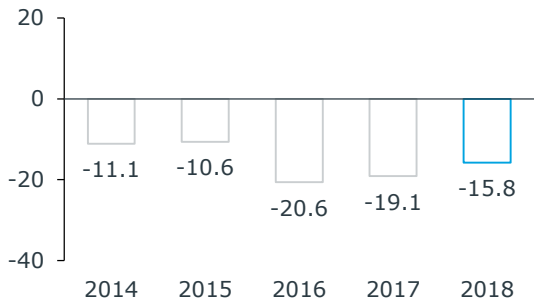
South Korea Hospital Validation Study

2018 Validation Study

Validation Results

Precision	46.9%	Bias	-15.8%

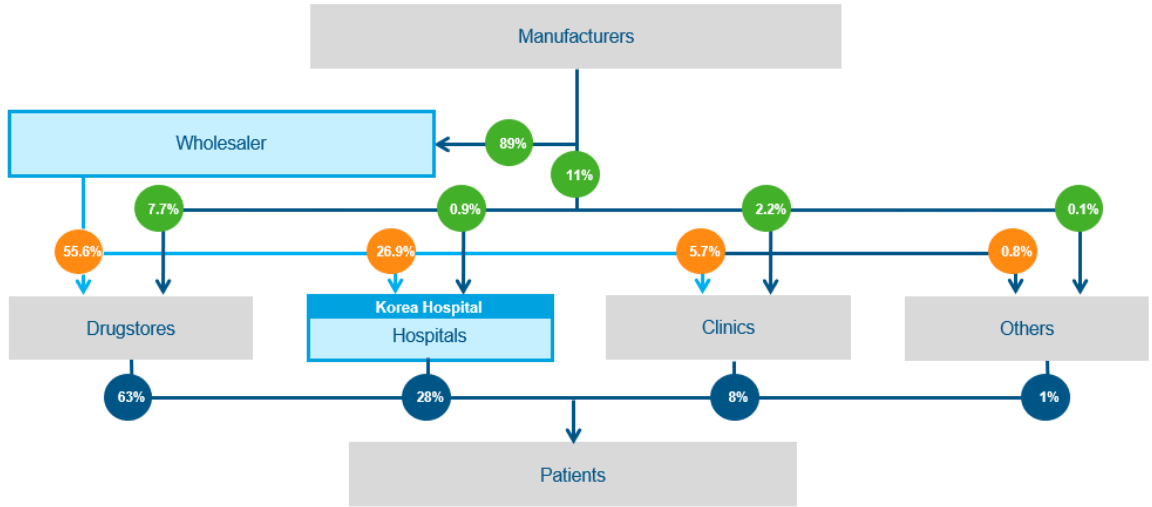




Outcomes

- Overall precision index declined by 3.5 percentage points in 2018
- Overall underestimation improved by 3.3 percentage points in 2018
- To review projection level, panel composition and advance QC methodology and input validity checks.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(+2 vPY)*	**113** *(-4 vPY)*	**1%** *(no change vPY)*

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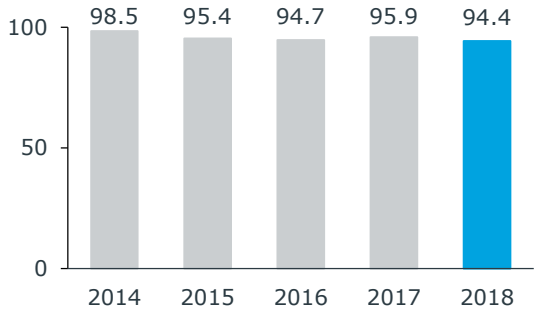
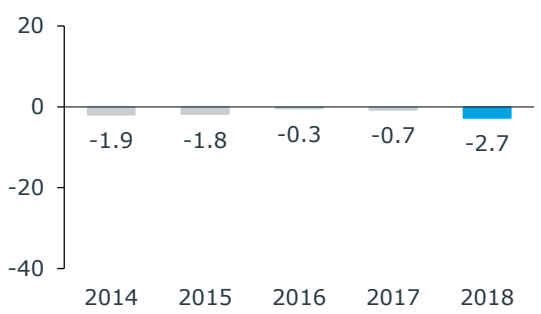
Pakistan Retail Validation Study

2018 Validation Study

Validation Results

Precision	94.4%	Bias	-2.7%

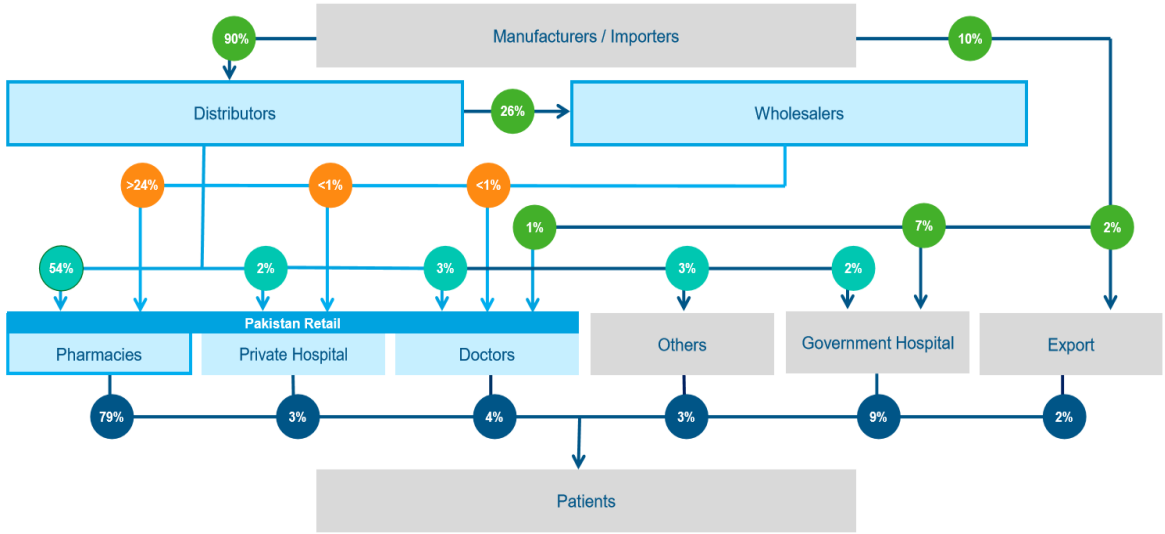




Outcomes

- Overall precision index declined by 1.5 percentage points in 2018
- Overall underestimation increased by 2.0 percentage points in 2018
- To maintain the participation level of the validation study.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
75 *(+17 vPY)*	**2,404** *(+475 vPY)*	**68%** *(+8% vPY)*

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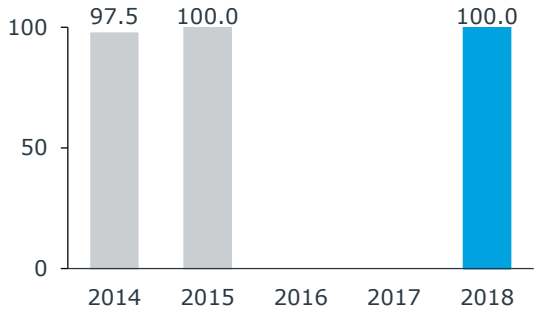
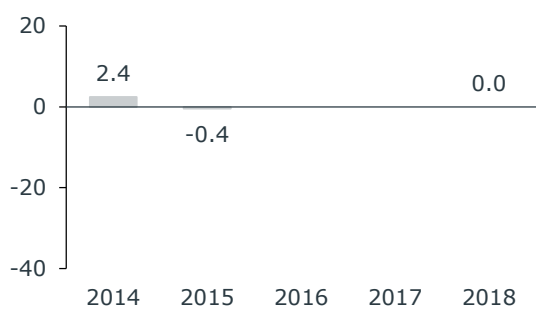
Philippines Retail Validation Study

2018 Validation Study

Validation Results

Precision	100%	Bias	0%

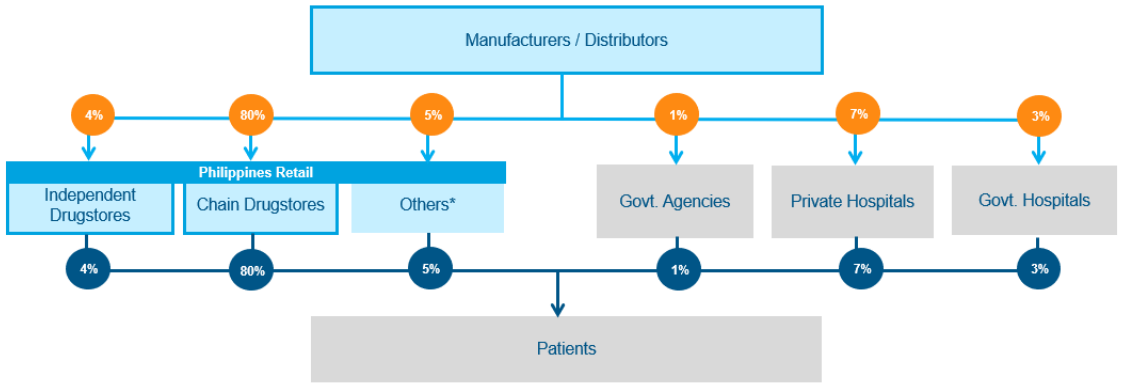




Outcomes

- Overall precision index remained unchanged at 100% in 2018
- Overall underestimation improved by 0.4 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
24 *(-47 v2015)*	**866** *(-1,210 v2015)*	**31%** *(-35% v2015)*

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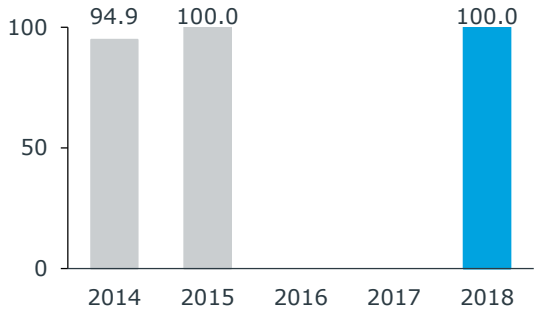
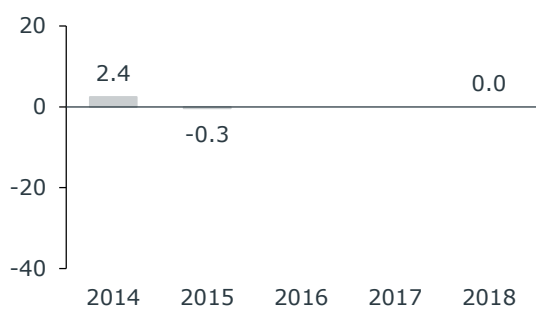
Philippines Hospital Validation Study

2018 Validation Study

Validation Results

Precision	100%	Bias	0%

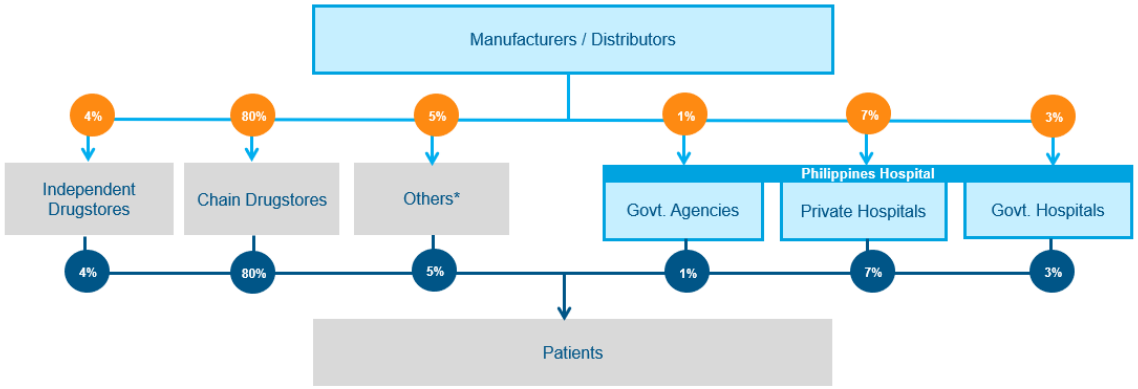




Outcomes

- Overall precision index remained unchanged at 100% in 2018
- Overall underestimation improved by 0.3 percentage points in 2018
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
20 *(-46 v2015)*	**282** *(-527 v2015)*	**20%** *(-29% v2015)*

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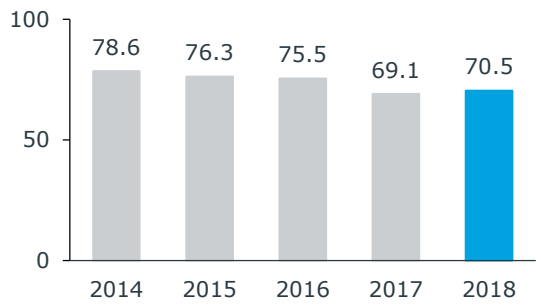
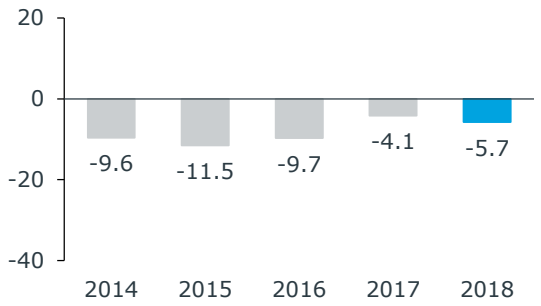
Singapore Retail Validation Study

2018 Validation Study

Validation Results

Precision	70.5%	Bias	-5.7%

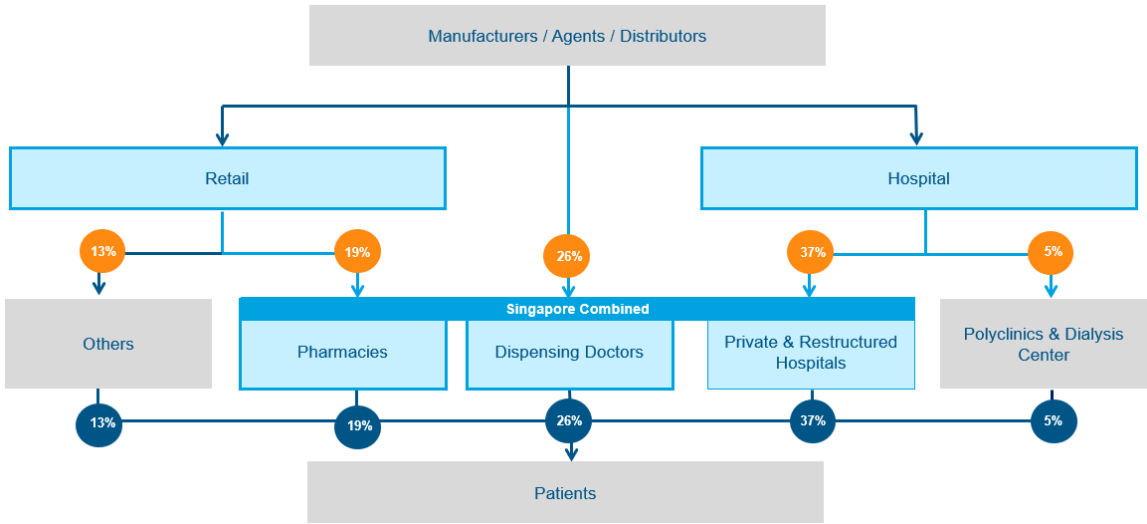




Outcomes

- Overall precision index improved by 1.4 percentage points in 2018
- Overall underestimation increased by 1.6 percentage points in 2018
- To review universe and panel composition to improve further

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
71 *(+12 vPY)*	**1,142** *(+456vPY)*	**35%** *(+7% vPY)*

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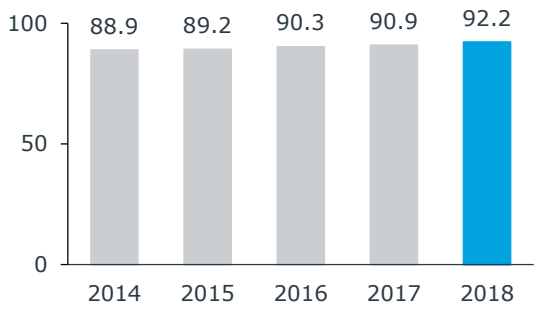
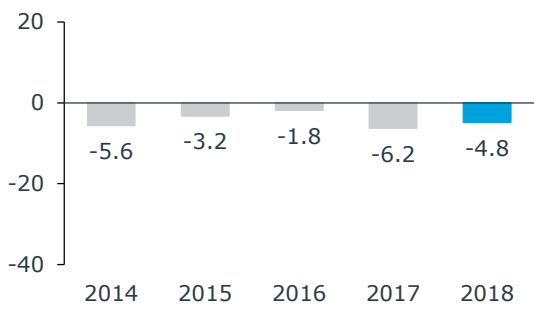
Thailand Retail Validation Study

2018 Validation Study

Validation Results

Precision	92.2%	Bias	-4.8%

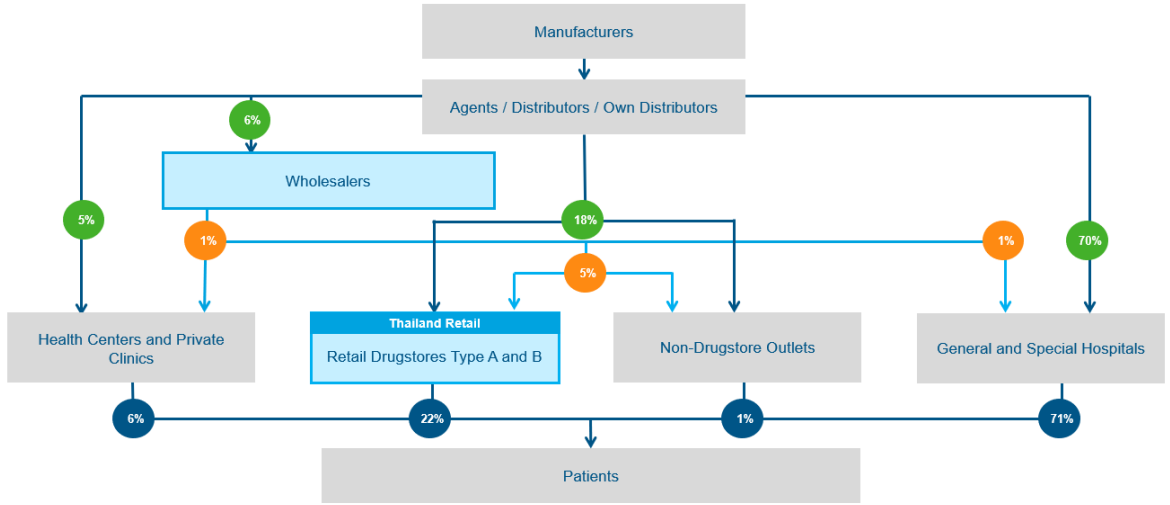




Outcomes

- Overall precision index improved by 1.3 percentage points in 2018
- Overall underestimation improved by 1.4 percentage points in 2018
- To enhance projection methodology and onboard new chain and independent panels.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
44 *(no change)*	**587** *(+94 vPY)*	**16%** *(+5% vPY)*

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Methodology

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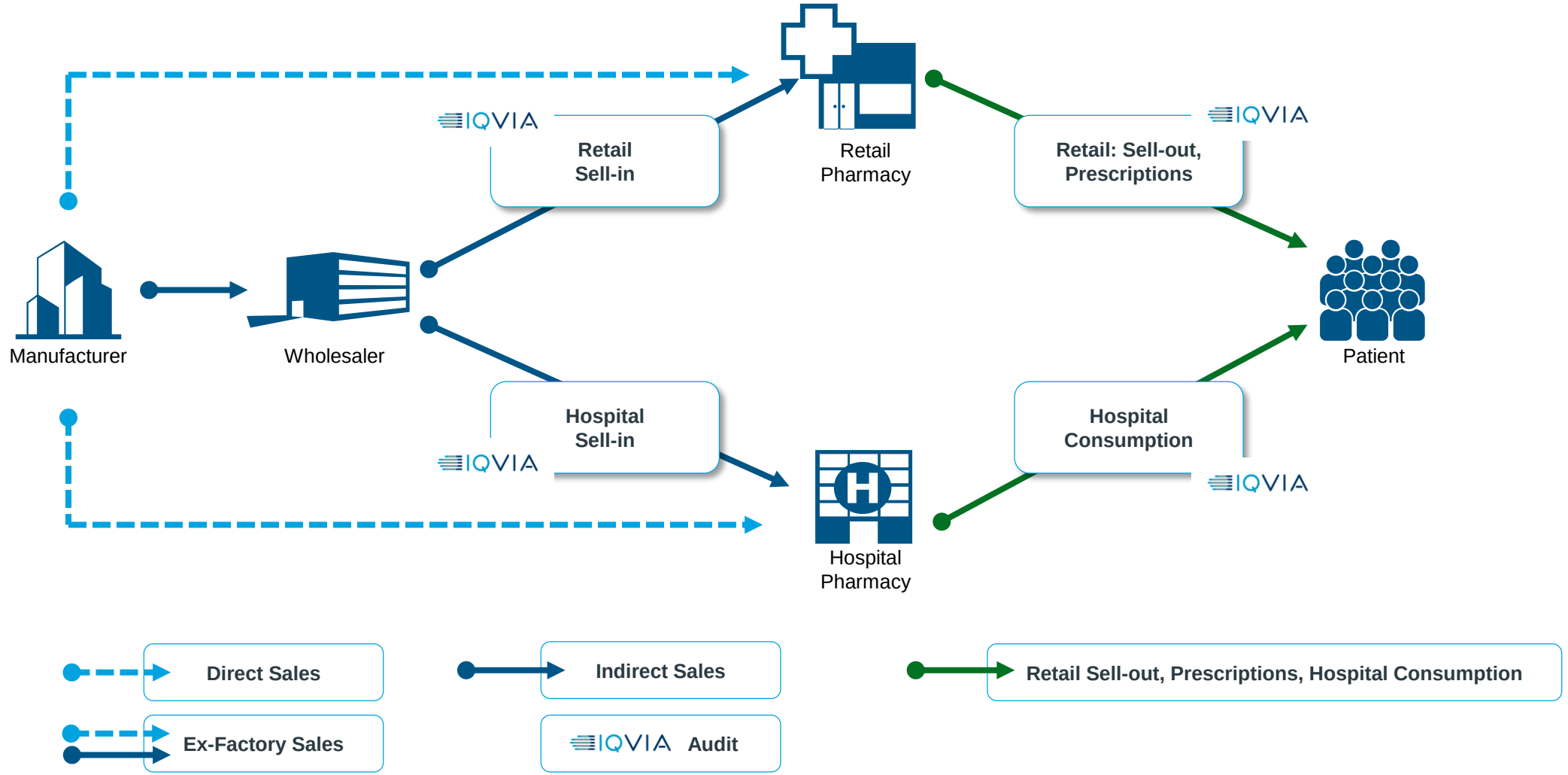
- On-target % vs. On-time % (how both compare)

Distribution Channels validated

ACTS compares the Manufacturer's ex-factory sales with IQVIA's audited channels



ACTS surveys 95% of the units market in the audited channel. Small 5% of product forms get excluded.

Decile Inclusion/Exclusion Schema

Total Market				
Decile	#Forms	Upper Limit (FY Units)	Total (FY Units)	Segment
1	16,746	288,316	421,249,733	Small 10%
2	874	795,338	421,315,079	Next 10% included
3	385	1,541,503	421,089,812	
4	206	2,782,743	421,471,438	Medium 30% Included
5	118	4,572,060	421,329,006	
6	66	9,143,464	427,161,847	
7	36	15,617,602	424,827,107	
8	20	34,458,310	444,648,076	Large 50% included
9	8	89,798,547	507,434,006	
10	2	206,855,970	299,757,682	
Total	**18,461**		**4,210,283,786**	
ACTS	**1,715**		**3,789,034,053**	

Decile 1 breakdown				
Decile	#Forms	Upper Limit (FY Units)	Total (FY Units)	Segment
1.01	12,546	20,349	42,128,674	
1.02	1,386	44,263	42,143,302	
1.03	771	67,192	42,167,630	Low 5% excluded
1.04	530	93,364	42,200,606	
1.05	390	122,163	42,163,778	
1.06	313	148,246	42,209,105	
1.07	258	181,048	42,244,392	
1.08	215	214,823	42,284,130	Next 5% included
1.09	183	248,645	42,301,336	
1.10	154	288,316	41,406,780	
	16,746		**421,249,733**	
	1,123		**210,445,743**	

ACTS breakdown				
Decile	#Forms	Upper Limit (FY Units)	Total (FY Units)	Segment
1.01-1.05	15,623	210,803,990	210,803,990	Small 5% excluded
1.06-2	1,997	631,760,822	631,760,822	Small 15% included
3-5	709	1,263,890,256	1,263,890,256	Medium 30% included
6-10	132	2,103,828,718	2,103,828,718	Large 50% included
	18,461	**4,210,283,786**	**4,210,283,786**	
	2,838	**3,999,479,796**	**3,999,479,796**	

FY = Full Year
This page only serves as a simplified illustration!

Validation Studies

How IQVIA measures Accuracy

1. **Once a year, IQVIA supplies clients with a software that includes estimated yearly sales volumes for each product pack**

2. **Clients enter their actual ex-factory sales volume based on what they supplied to the validated market channel, e.g. retail pharmacies**

3. **Validation Studies then produce two key quality statements:**

   – **BIAS**: Average over/underestimation of the market or a single product

   – **PRECISION**: Percentage of product forms weighted by its IQVIA units within a predefined deviation range

Validation Metrics

Bias: % of Over- or Underestimation

Interpretation

- The objective of Bias is to provide a robust estimation of average deviation between IQVIA data and Real data.
- Bias measures the level of deviation caused by systematic errors, e.g.
  - projecting to a too small universe may result in a negative bias (=underestimation) or
  - systematically collecting incomplete data from panels may lead to underestimated projected results or
  - not capturing 100% of the market, say because of unaudited channels (like private clinics) is another reason for Bias (here underestimation)
- Extreme R-Values distort robustness. Therefore, R-Values outside ±52.5% interval are excluded.

Calculus

Pack	Audit Units	Real Units	R-Values
A	1,000	900	1.111
B	1,200	1,500	0.800
C	4,000	3,800	1.053
D	6,500	7,000	0.929
E	7,200	7,400	0.973
Sum	19,900	20,600	0.966

Bias = -3.4%

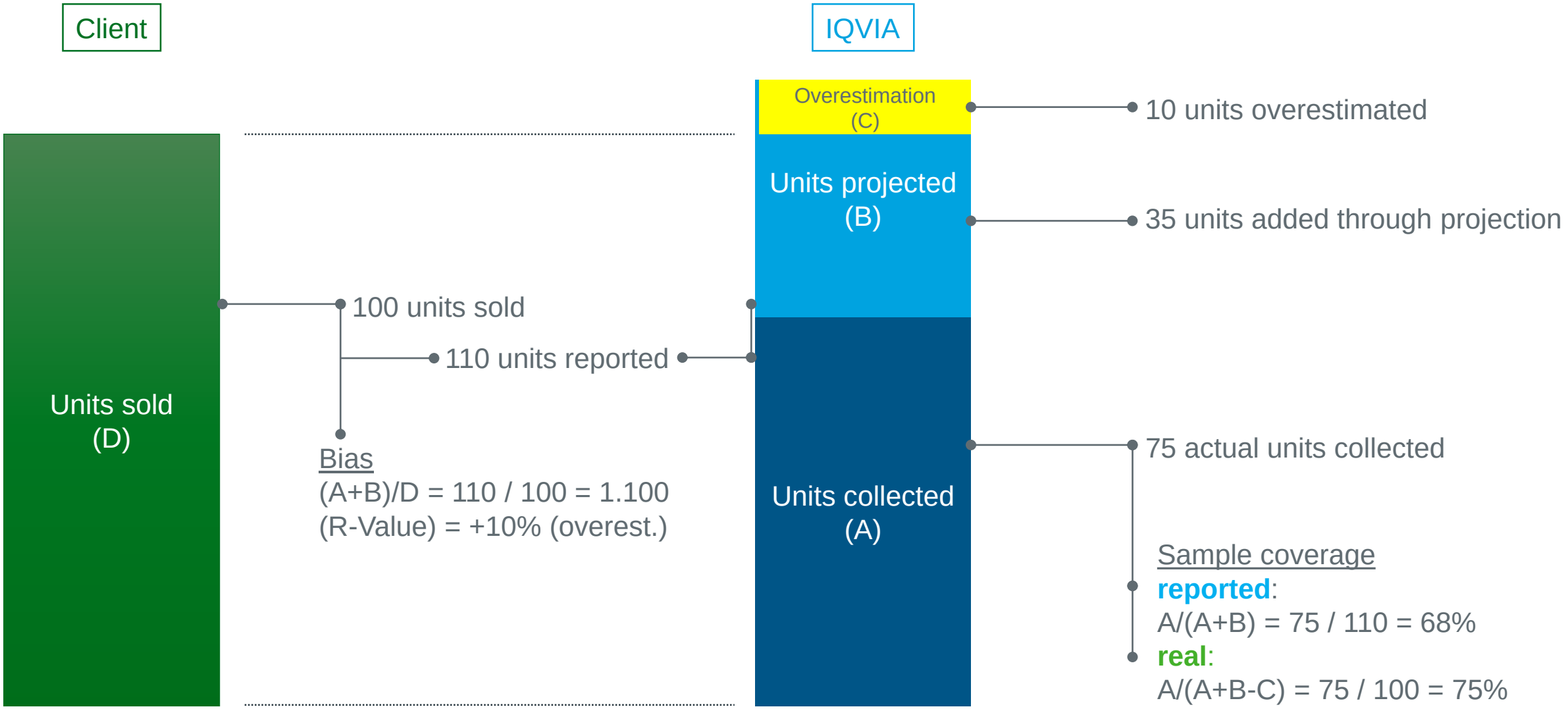
Average over/underestimation (Bias) in %

$$= \left(\frac{\textbf{Total Audit units } of \text{ all validated product forms}}{\textbf{Total REAL units } of \text{ all validated product forms}} \text{ -1 } \right) * 100$$

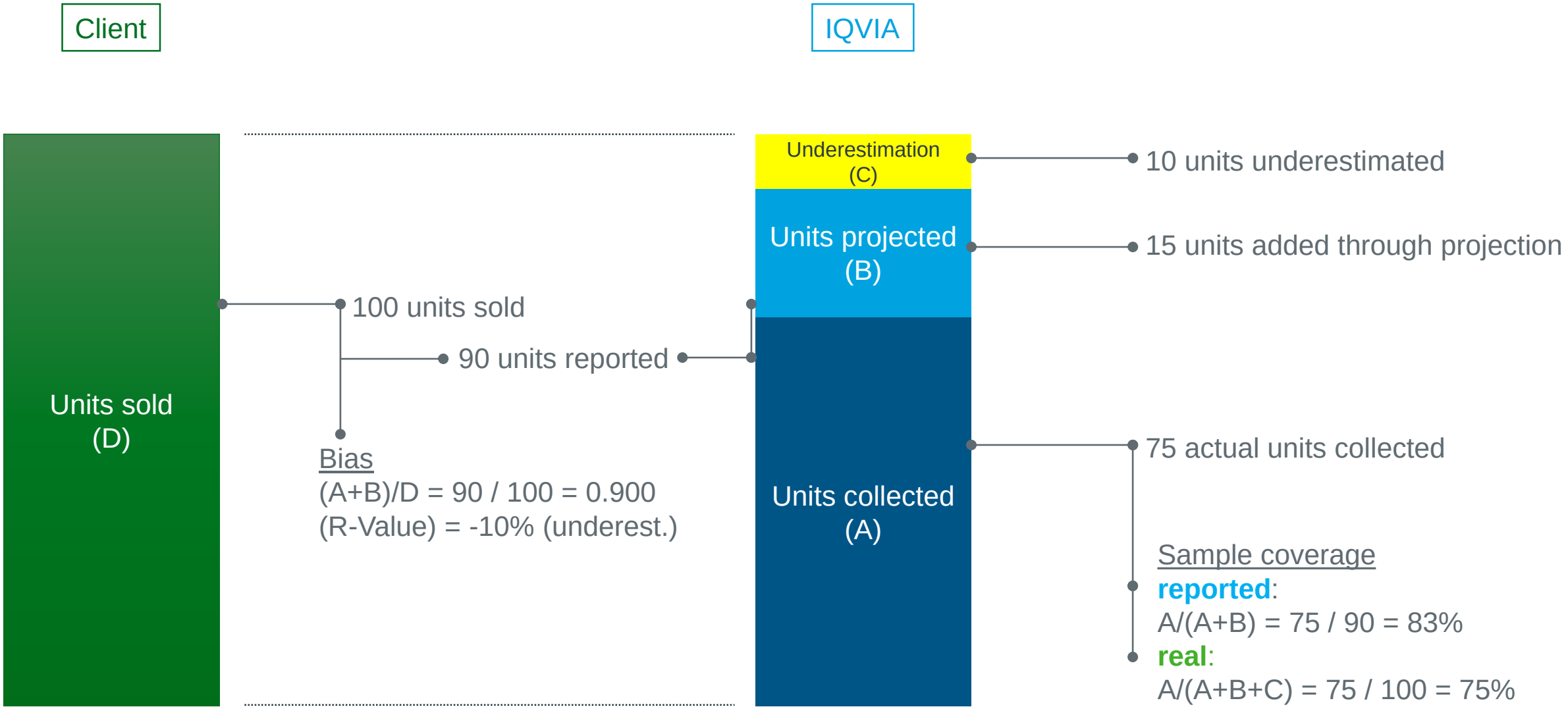
Limitations

- Inclusion of unaudited market channels (e.g. private clinics/dispensing doctors or tender) into real sales data affects bias measurement. Participants are not always able to segregate their sales to the validated segment.
- Low validation coverage may lead to an inaccurate bias measure. The higher the number of participants the better.
- Purposive selection of therapeutic classes or products into the validation data set provides an unrepresentative bias measure.

Overestimation



Underestimation



Validation Metrics

Precision: % of products in a fixed range of deviation

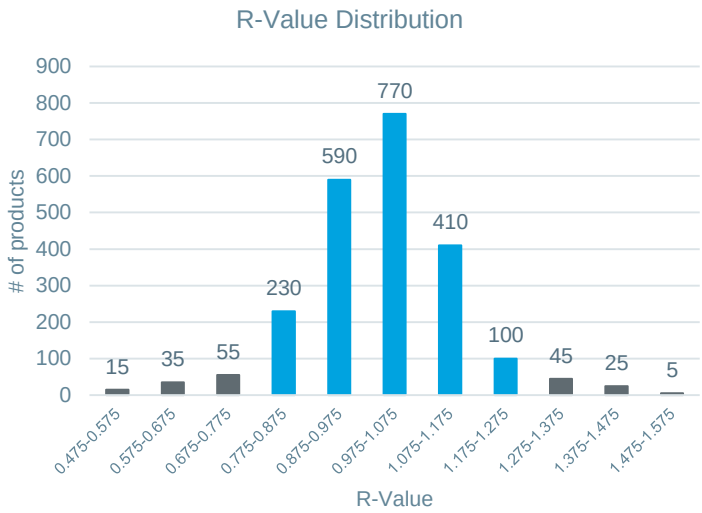
Interpretation

- Precision index measures the R-Value dispersion, i.e. it measures how many R-Values (weighted by its IQVIA units) lay inside a ±22.5% interval around the overall Bias.
- Different to Bias which measures systematic effects, the Precision Index measures the random effect of a sample.
- A low precision index usually indicates that the underlying sample size is too small/not representative and also causes wrong market shares and rankings.
- A high precision index indicates a representative sample size and is a result of consistent projected numbers. This is being measured around the average Bias which either can be negative or positives.

Calculus

R-Value Distribution		
From	To	# Forms
0.475	0.575	15
0.575	0.675	35
0.675	0.775	55
0.775	*0.875*	*230*
0.875	*0.975*	*590*
0.975	*1.075*	*770*
1.075	*1.175*	*410*
1.175	*1.275*	*100*
1.275	1.375	45
1.375	1.475	25
1.475	1.575	5
Total		**2,280**

∑= 2,100 R-Values inside the ±22.5% interval



$$\text{Precision} = \frac{2,100}{2,280} \text{x } 100 = 92.1\%$$

Timeliness

Speed of Delivery

Definition

- “Elapsed days after reporting period” measures the number of days, after the end of the reporting period until time of delivery on MIDAS.
- “On-Target %” measures how many data deliverables where shipped on MIDAS within a certain number of days.
- Thresholds:
  - Monthly: Actual ≤ 30 days
  - Quarterly: Actual ≤ 45 days
- Databases in scope:
  - Monthly MIDAS
  - Quarterly MIDAS

On-Target % vs. On-Time %

	On-Target %	On-Time %
Transaction	Country/Region*Audit*Period *(period = data month!)*	Country*Audit*Period*Client *(period = calendar month!)*
Measure	Days after Period (DAP)	Actual vs. Schedule
Threshold	Monthly: Actual < 30 days Quarterly: Actual < 45 days	Actual < Schedule (agreed)
Handling	Threshold is applied consistently to any country and audit.	Threshold is individual by country and considers local agreements with clients.
Interpretation	Metric measures if deliverable is within threshold (DAP), hence the time it took after period to build databases.	Metric measures if deliverable is as per the plan. It considers agreed delivery dates with clients.
Real world	„I received August data with delay“	„I got a late delivery in August“
Publication	ACTS Annual Report	n/a

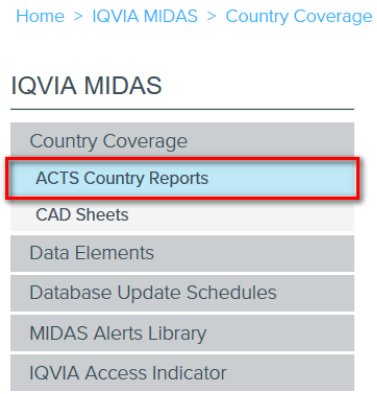
DAP data being used is also published on MIDAS Delivery Performance: https://customerportal.imshealth.com/sites/imsportal/product-support/midas-products-psa/iqvia-midas/psa/database-update-schedules

ACTS content now available on IQVIA Customer Portal

How to access?

Access

If you are new to the customer portal, please self-register here. Once you got your account set up, please access ACTS country results here: ACTS Country Reports.



Countries/Regions available

Algeria	Egypt	Mexico	Tunisia
Argentina	Estonia	Morocco	Turkey
Austria	Finland	Pakistan	UAE
Bangladesh	France	Peru	UK
Bosnia	Germany	Philippines	Uruguay
Brazil	Greece	Poland	USA
Bulgaria	Hong Kong	Russia	
Canada	Hungary	Saudi Arabia	
Cen. America	Italy	Serbia	
Chile	Japan	Singapore	
China	Jordan	Slovakia	
Colombia	Kazakhstan	Slovenia	
Croatia	Kuwait	South Africa	
Czech R.	Latvia	South Korea	
Dominican R.	Lebanon	Switzerland	
Ecuador	Lithuania	Thailand	

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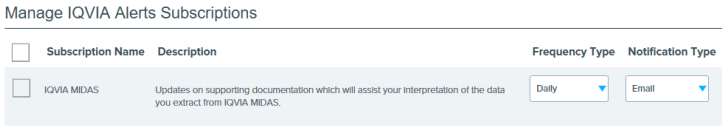
- “IQVIA MIDAS”

and your individual frequency and notification type:



2019 ACTS Annual Report

Presented to you by IQVIA's Global Data Science and Advanced Analytics Team with offices in Plymouth Meeting (United States), Frankfurt (Germany) and Beijing (China)

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