2020 ACTS Annual Report

Statistical Quality Assurance applied to IQVIA's Information Offerings

Global Data Science and Advanced Analytics

(v20210405)

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Welcome

Thank you for downloading the most recent ACTS annual report, IQVIA's Statistical Quality Assurance program. It's now the second edition being available on the IQVIA Customer Portal, with single country-pages available for download as validation results are ready for sharing with MIDAS data users and people interested in IQVIA's continuous quality measurement.

The report is labeled '2020 ACTS Annual Report' which consolidates validation analyses on data spanning years 2015 thru 2019. Despite the unprecedented COVID-19 pandemic situation globally, a big ***Thank you*** goes to all data subscribers helping IQVIA to keep the quality measurement going even at these challenging times, and a big ***Thank You*** to IQVIA's Client Service and Data Science teams, who relentlessly collected, cleansed and analyzed underlying data. Although industry and businesses are impacted like never before the COVID-19 pandemic, clients worked very hard to share ex-factory sales with IQVIA. We really appreciate all the efforts from our clients to make this quality measurement uninterrupted.

The report in its new edition is a summary of ~90 single channel validation results, IQVIA analyzed data from 3000+ pharma companies and affiliates who shared data for validation on 80,000+ product forms. The analyses produced quality measurements which enable readers to compare country-level results with each other and enable IQVIA offering development teams and statistical methodologists to identify actions to improve quality of MIDAS.

ACTS country reports are available on the IQVIA Customer Portal. The country results are 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.

If you have questions about the methodology being used for deriving the quality metrics Bias and Precision and for 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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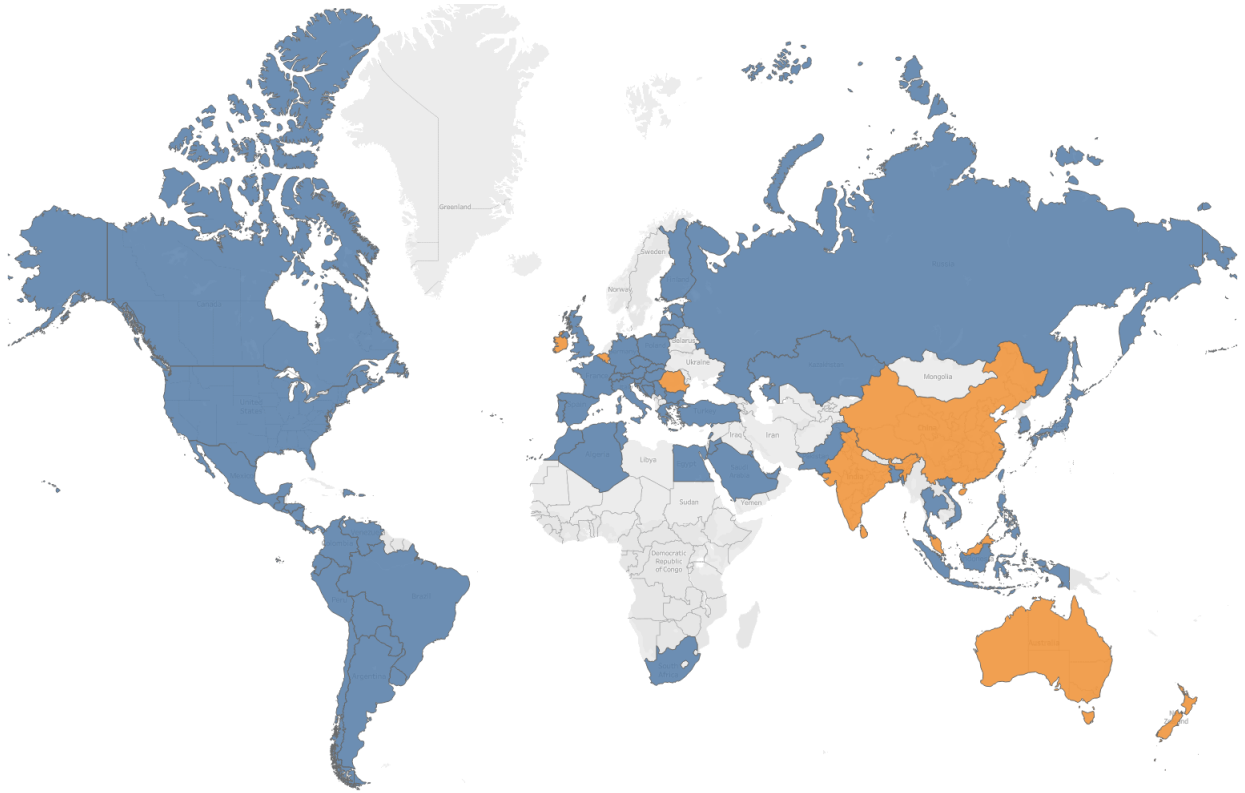
Accuracy: Global & Regional Results

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:

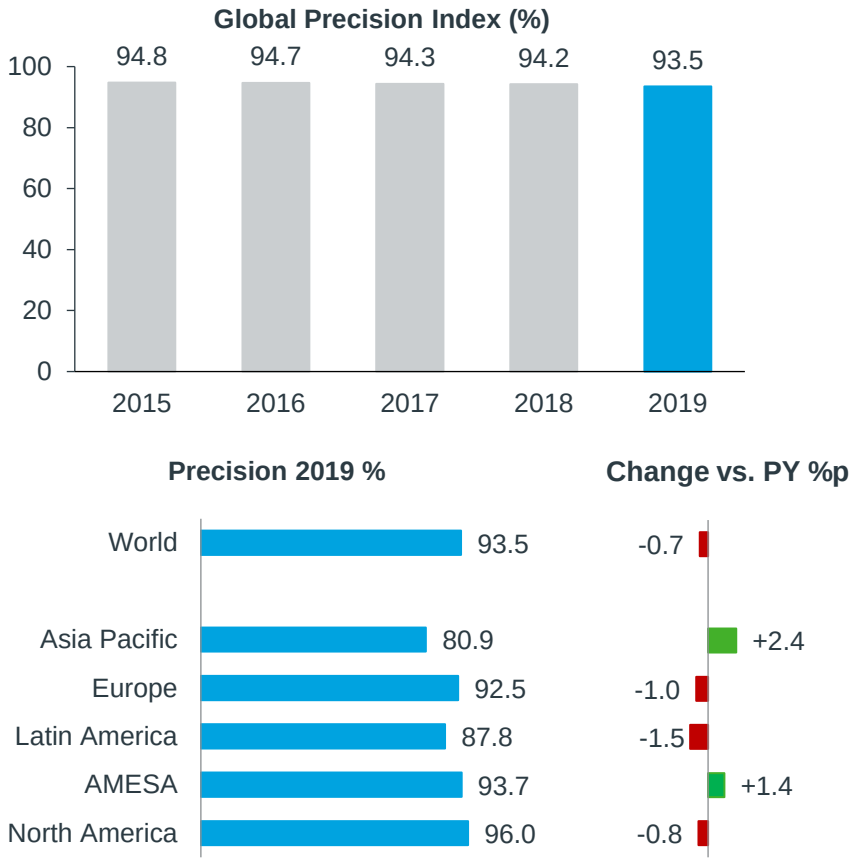
- Australia
- Belgium
- China
- India
- Ireland
- Malaysia
- New Zealand
- Romania
- Sri Lanka

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, Romania**.
- 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. **Malaysia**.
- 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. **China**.

Results

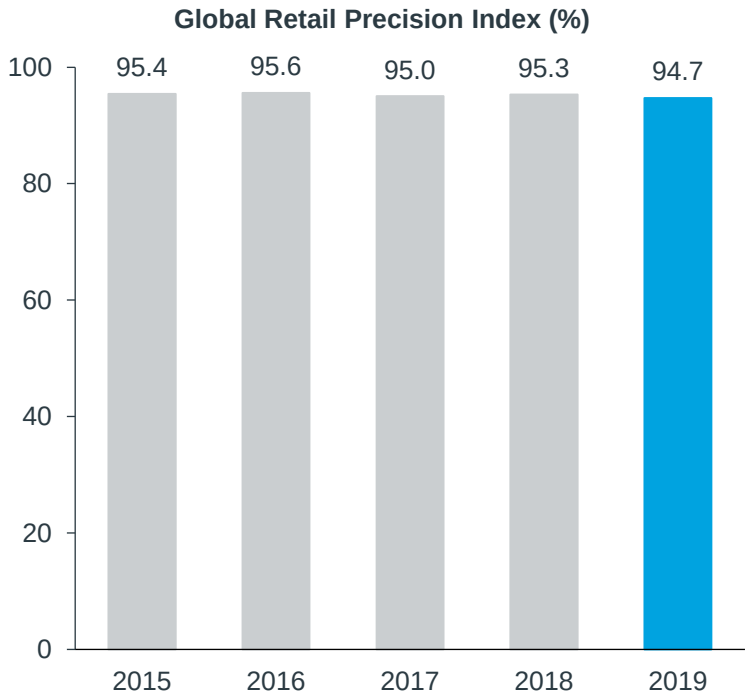


Summary

- Global precision index slightly reduced by 0.6% points in 2019 but still remains above 93%.
- 2019 result of 93.5% 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 96.0%.
- Asia Pacific region is ranked with lowest precision of 80.9% but has improved vs. previous year.

Countries with improved and deteriorated precision

Retail Validation Results

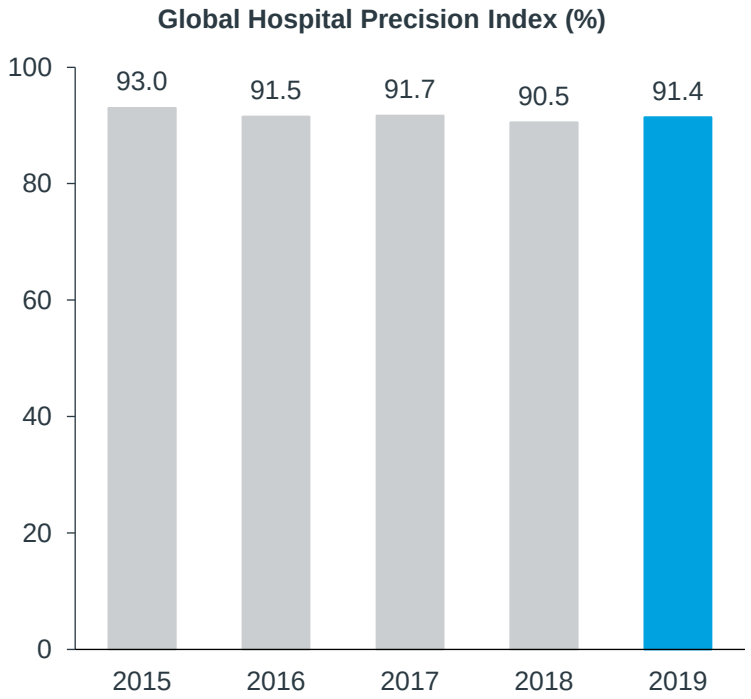


Country	Improvement	
	Precision 2019 %	Change vs. 2018 %p
Bangladesh	84.0	+6.4
Central America	94.6	+6.3
Colombia	87.0	+2.7
Dominican Rep.	85.5	+4.6
Pakistan	97.4	+3.0
Poland	97.7	+3.1
South Africa	96.2	+10.4

Country	Deterioration	
	Precision 2019 %	Change vs. 2018 %p
Chile	91.7	-4.6
Egypt	95.3	-4.4
Italy	91.7	-4.5
Mexico	80.7	-6.3
Paraguay	46.2	-2.5

Countries with improved and deteriorated precision

Hospital Validation Results

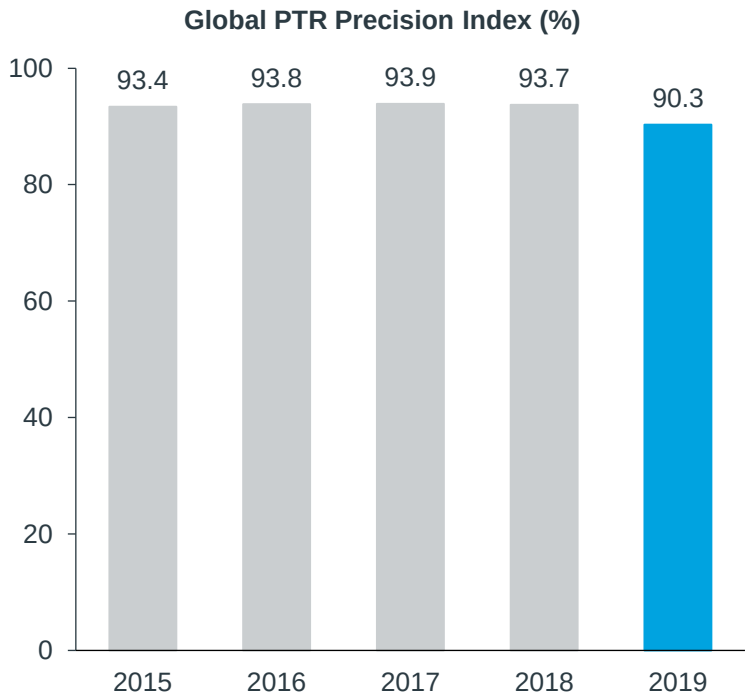


Country	Improvement	
	Precision 2019 %	Change vs. 2018 %p
Austria	89.3	+6.6
Italy	88.1	+2.9
Poland	97.7	+3.1
South Korea	57.0	+10.1
United Kingdom	93.9	+3.8

Country	Deterioration	
	Precision 2019 %	Change vs. 2018 %p
Germany	80.1	-7.0
Slovenia	95.3	-4.4

Countries with improved and deteriorated precision

Pharmacy Sell-out (PharmaTrend PTR) Validation Results

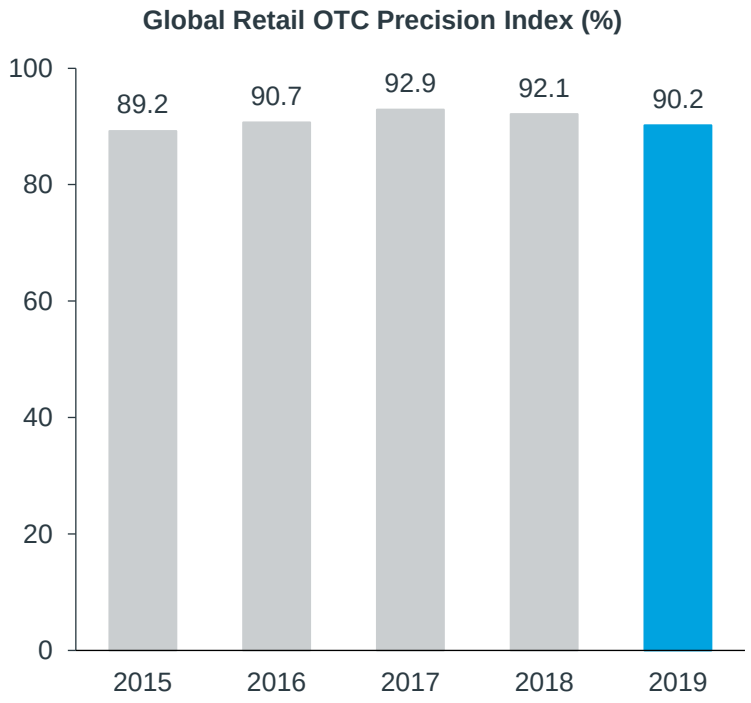


Improvement		
Country	**Precision 2019 %**	**Change vs. 2018 %p**
Poland	92.6	+3.0

Deterioration		
Country	**Precision 2019 %**	**Change vs. 2018 %p**
Austria	92.6	-3.3
Germany	88.9	-4.0
Italy	87.9	-7.7

Countries with improved and deteriorated precision

Retail OTC Validation Results



Country	Improvement		Country	Deterioration	
	Precision 2019 %	Change vs. 2018 %p		Precision 2019 %	Change vs. 2018 %p
Argentina	91.3	+5.7	Bulgaria	87.8	-5.4
Poland	88.3	+5.6	Germany	88.2	-6.3
South Africa	93.3	+7.2	Mexico	79.1	-16.8
South Korea	83.1	+9.8	Slovakia	90.2	-5.5

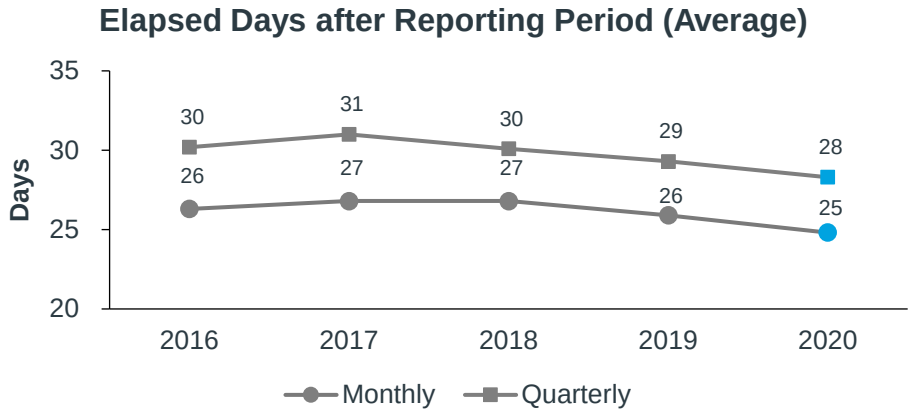
Timeliness

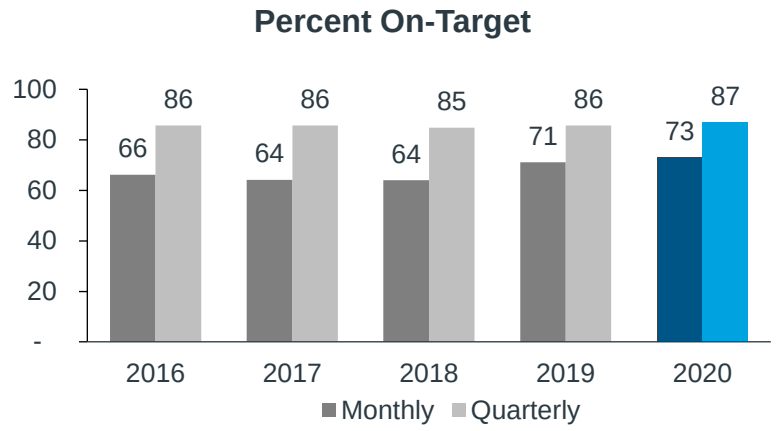
Content covered in this section

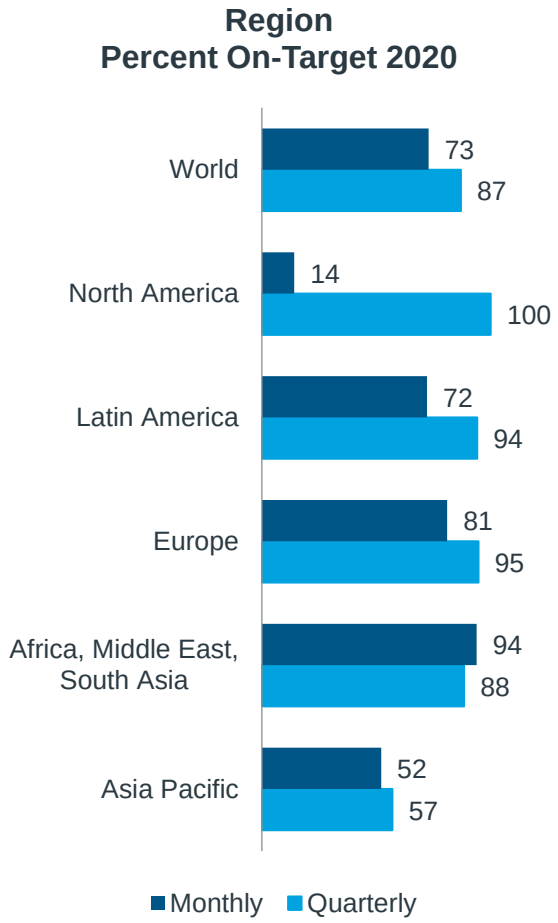
Timeliness	1	Statistics featured in this section pertain to number of days, after the end of the reporting period until time of delivery on MIDAS.
Metrics	2	“Elapsed days after period” and “Percent On-Target” are the two key performance indicators that express Timeliness / speed of delivery on MIDAS.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

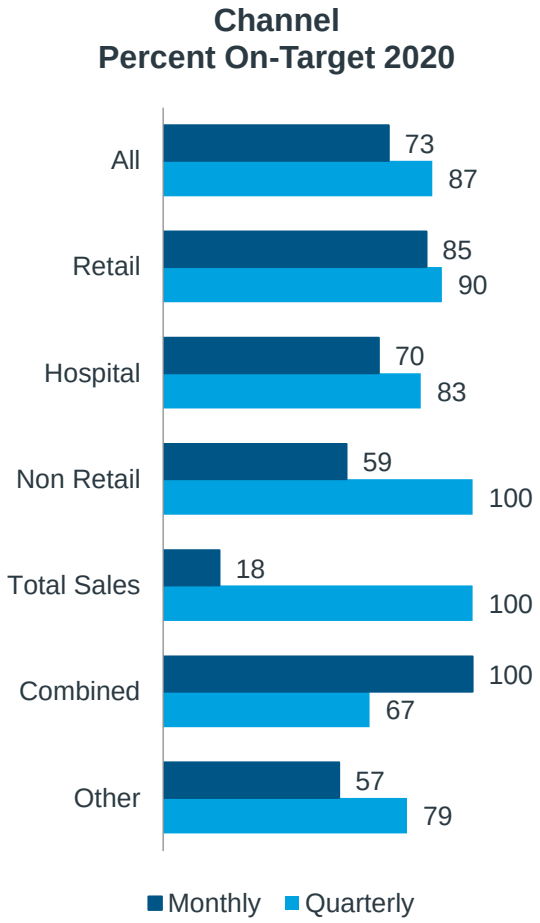
Timeliness being measured against delivery targets of 30 days for Monthly MIDAS and 45 days for Quarterly MIDAS
DAP data being used is also published on MIDAS Delivery Performance: https://customerportal.imshealth.com/sites/imsportal/product-support/midas-products-psa/iqvia-midas/psa/database-update-schedules

DAP improved by 1 day on both monthly and quarterly deliverables.









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

Number of deliverables used for measuring Timeliness

	2016		2017		2018		2019		2020	
	MONTH	QUARTER	MONTH	QUARTER	MONTH	QUARTER	MONTH	QUARTER	MONTH	QUARTER
Channel										
Combined	60	32	60	32	60	32	60	32	60	32
Hospital	443	176	443	176	444	176	444	176	444	175
Non-Retail	36	12	36	12	36	12	36	12	36	12
Other	94	42	96	44	96	44	96	44	96	44
Retail	744	284	744	284	744	284	744	284	744	284
Total Sales	132	48	132	48	132	48	132	48	132	48
Total	**1,509**	**594**	**1,511**	**596**	**1,512**	**596**	**1,510**	**596**	**1,512**	**595**
Region										
North America	132	48	132	48	132	48	132	48	132	48
Latin America	192	68	192	68	192	68	190	68	192	68
Europe	813	276	815	276	816	276	816	276	816	275
Africa, M. East, S. Asia	216	90	216	92	216	92	216	92	216	92
Asia Pacific	156	112	156	112	156	112	156	112	156	112
Total	**1,509**	**594**	**1,511**	**596**	**1,512**	**596**	**1,510**	**596**	**1,512**	**595**

Timeliness being measured against delivery targets of 35 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

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

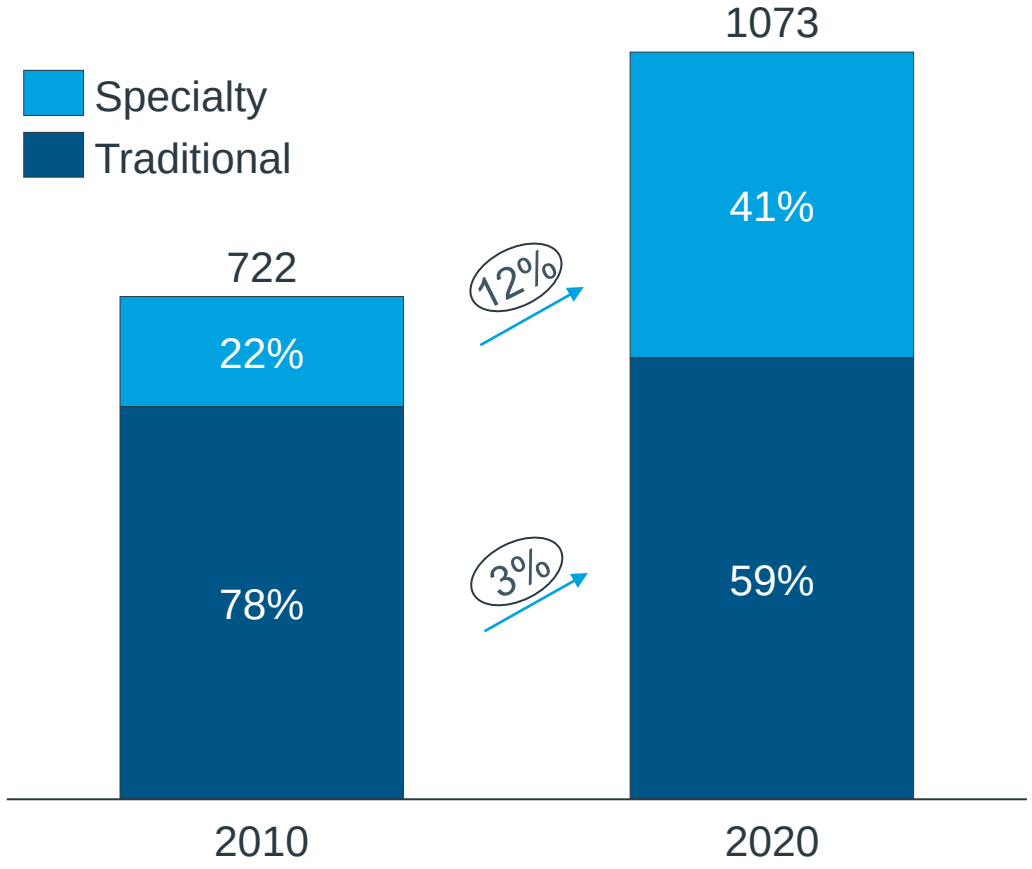
ATC 4th level definition of Specialty

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	

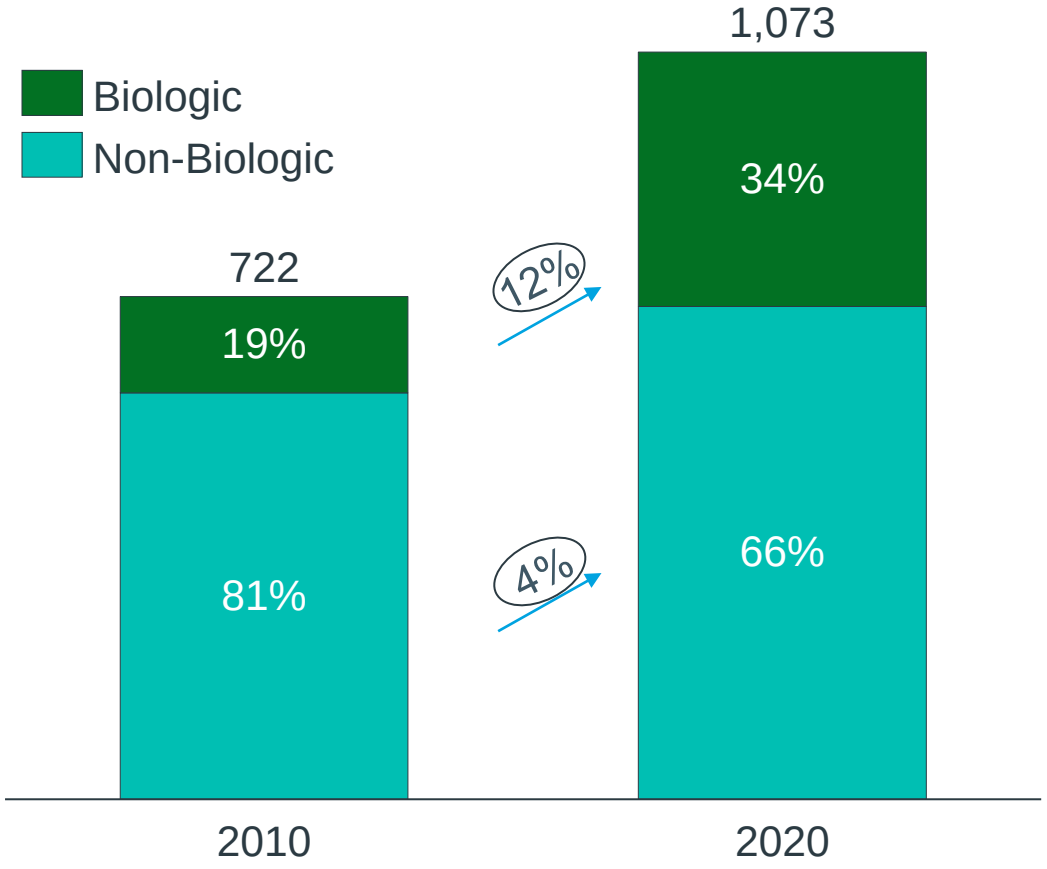
* Anti-TNF, specific anti-rheumatic agents and immunosuppressants
** not represented in this report
*** Acromegaly, Erythropoietins (Anemia), Gaucher's (Metabolic Disease), Growth hormones, Hemophilia, Immunoglobulins, Infertility, INJ CORTICOSTEROIDS PLN, Interferons (Hepatitis C, MS), Osteoporosis,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

Specialty and biologics have seen double digit growth in the last decade and increased share of total market

Specialty and Traditional (Q2 2010-20) US$ Bn



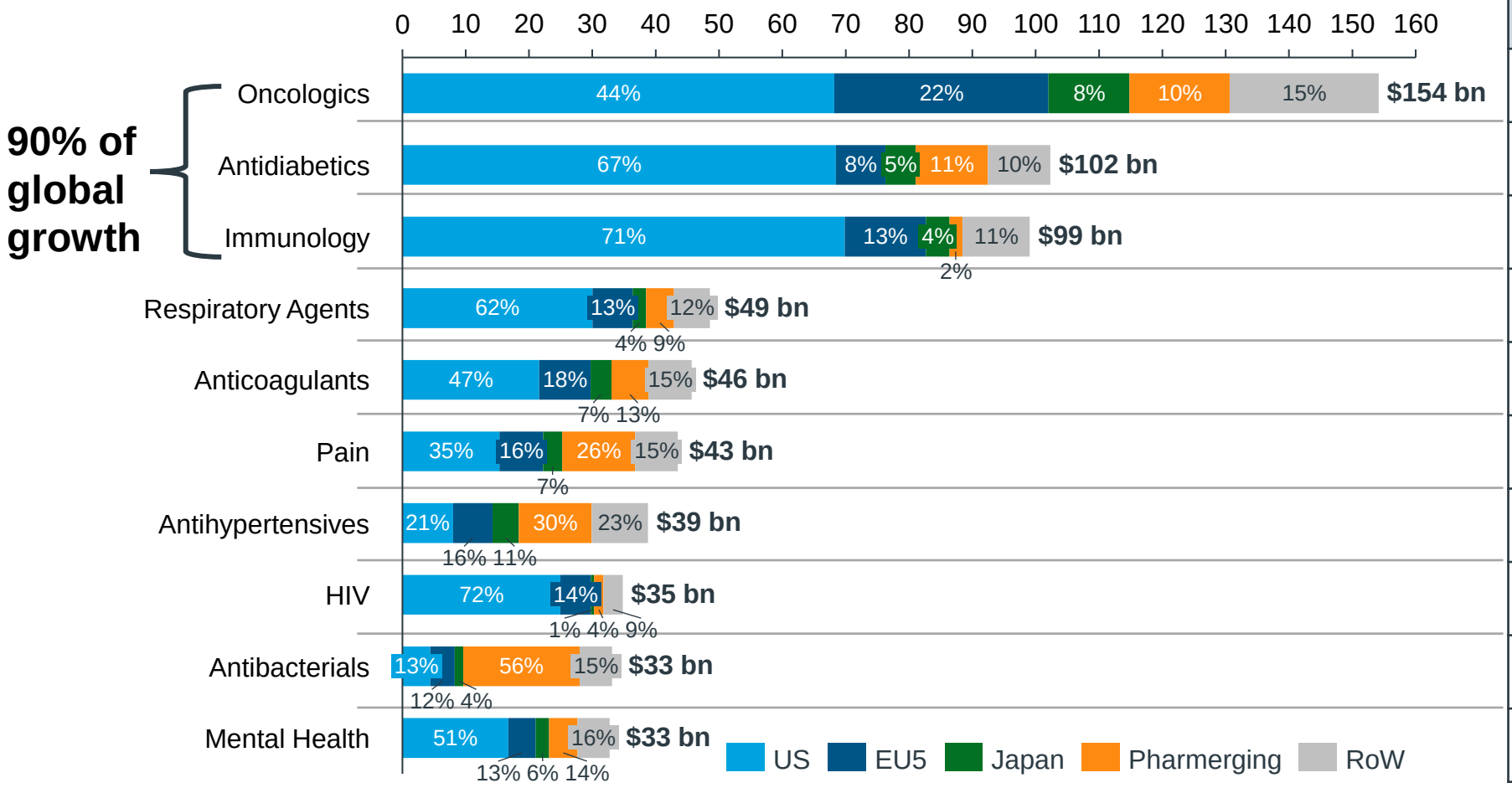
Biologics and small molecules (Q2 2010-20) US$ Bn



Source: IQVIA MIDAS MAT Q2 2020; Rx only

Specialty areas dominate sales and growth driven by developed markets with growth highly concentrated in top 3 TAs

2020 Global Sales | Top 10 Therapy Areas in Bn US$

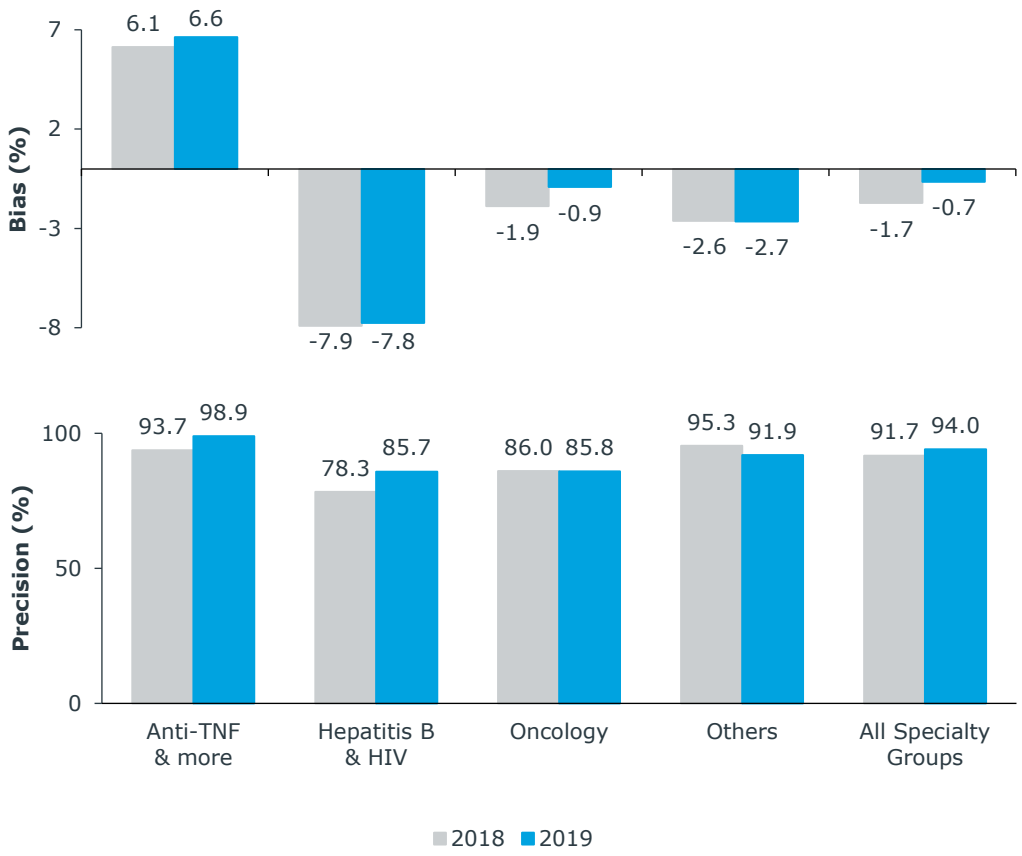


	2019-20 Absolute Growth*	2019-20 Growth (%)	Contribution to global growth (%)
Oncologics	19.2	14.4%	40.5%
Antidiabetics	9.7	10.6%	20.5%
Immunology	14.3	16.9%	30.1%
Respiratory Agents	2.1	4.6%	4.5%
Anticoagulants	4.9	12.2%	10.4%
Pain	0.1	0.3%	0.3%
Antihypertensives	2.3	6.4%	4.8%
HIV	2.3	7.8%	5.3%
Antibacterials	-3.3	-9.2%	-6.9%
Mental Health	1.2	3.7%	2.5%

Note: Growth in LCUS on YoY basis
Source: IQVIA MIDAS MAT Q2 2020, Rx only

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	France Germany	Austria Croatia Czech Republic France Germany Hungary Italy Mexico Pakistan Serbia Slovakia Slovenia South Africa Turkey United Kingdom	Argentina Czech R. France Germany Hungary Italy Pakistan Peru Serbia South Africa South Korea Switzerland Turkey	Argentina Austria Bangladesh Brazil Croatia Czech R. Ecuador France Germany Greece Hungary Italy Kazakhstan Lebanon Lithuania Mexico Pakistan	Peru Philippines Poland Saudi Arabia Serbia Slovakia Slovenia South Africa Turkey UAE United Kingdom Uruguay
Specialty products surveyed	**237**	**79**	**1,047**	**651**	**3,051**	

*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

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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

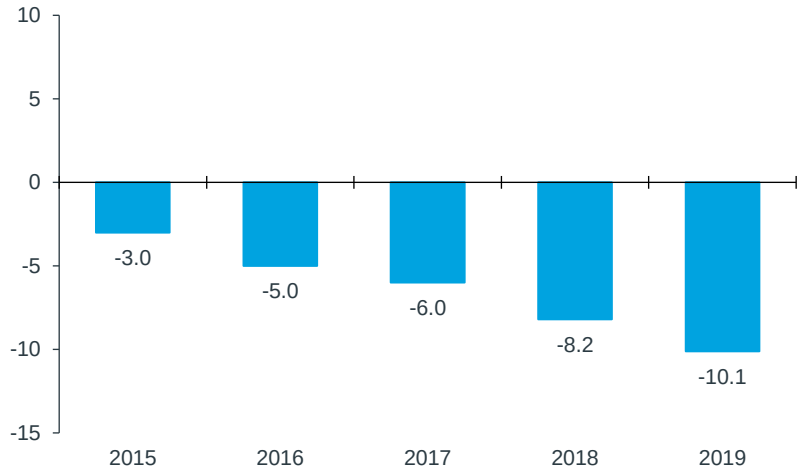
Customers can use IQVIA Market Prognosis to:

- 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

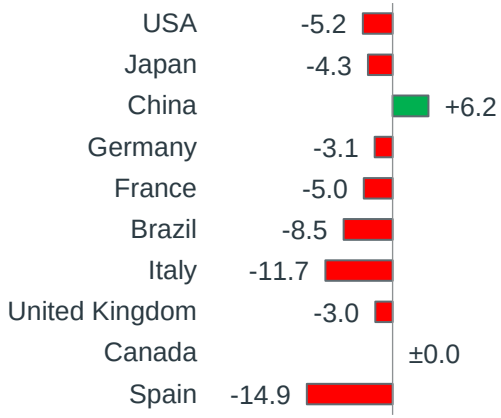
Market Prognosis

Validity of Annual Forecasts

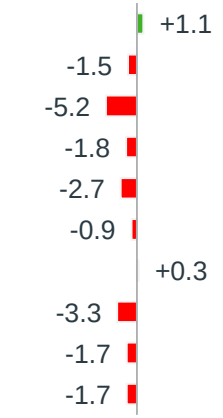
Forecasting Bias (%) based on 47 Countries



Leading 10 Markets
5 years (2015..2019)



Leading 10 Markets
1 year (2019)



Region	Average Bias (%) 2014..2018	2015..2019
AMESA	+1.2	+0.5
Asia Pacific	-0.5	-4.6
Europe	-9.9	-9.0
Latin America	-2.6	-9.0
North America	-8.6	-2.6
All Regions	**-5.1**	**-6.4**

Market Prognosis on selected Markets

Commentary

United States

- The US pharmaceutical market was expected to grow at a CAGR of 4.2% over 2014-2019. However, the market experienced stronger growth over the five year period, especially in the short term due to following factors:
  - Stronger than expected growth during 2014-2016 - buoyed by the impact from new innovative drug launches, including Sovaldi (sofosbuvir) and its successor Harvoni (ledipasvir + sofosbuvir) - which offered a cure rate of 90% in treated Hepatitis C patients. Sales of the J5B1 class which includes these new hepatitis C drugs - contributed 2.4% to total market growth in 2014 and 1.4% in 2015.
  - Weaker than expected impact from loss of exclusivity (LoE) of some major brands due to extensions in patent expiry dates.
  - Restated historical MIDAS sales data for the six-year period 2010 to 2015 - which lifted total audited sales growth in 2015 by 0.5% to 11.7%, and by 0.9% to 13.7% in 2014, compared with non-restated.
- Growth in later years was also slightly higher than expectation due to (i) stronger contribution to growth from innovative new products (ii) higher price driven growth from older brands and (ii) lower negative impact from LoE due to delayed entry of generics/biosimilars for blockbuster brands (including Humira).

Japan

- As of early 2015, the Japanese market was expected to grow at a CAGR of 0.7% during 2014-2019, with growth driven by (i) faster market access to innovative new drugs owing to PMDA reforms to drive regulatory efficiencies; (ii) allocation of premiums for new drug developments, shielding originator brands from discount based price cuts during biennial revisions; and (iii) increase in consumption tax in April 2014, and again in April 2017, that would have boosted government revenues and contributed marginally to average price growth.
-
- However, the market witnessed slightly higher growth in the five-year period, expanding at a CAGR of 1.3%, which was largely driven by the launch of hepatitis C drugs - Sovaldi (sofosbuvir) and Harvoni (ledipasvir + sofosbuvir) - in 2015. These two products alone were responsible for more than one-third (2.3%) of the overall increase in market value (6.3%) through 2015, registering sales of Yen111.8 billion and Yen117.6 billion, respectively, within 6 months of launch.

China

- After a decade of strong, double-digit growth, China market growth slowed sharply in 2015, under the impact of intensifying pricing pressures in the tender system, reforms to the hospital financing system, and tightening reimbursement claim controls, slowing to single digits for the first time in over a decade. The double-digit historical growth in the decade to 2014, on the back of which the 2015 forecast was produced, led to strong baseline growth. While the baseline expected a gradual slowdown, reinforced by a number of negative events in the evented forecast, the resulting 2015-2019 forecast underestimated the suddenness and magnitude of the slowdown.
- After two years of weak single-digit growth in 2017 and 2018, growth picked up sharply in 2019, driven by an increase in both volume and the average price per standard unit, as recent measures taken to improve access to innovative new drugs, notably reforms to the drug approval process and national price negotiations introduced to allow innovative new drugs to gain access to the National Drug Reimbursement List, had a stronger-than-expected effect, benefitting oncology therapies in particular.

Market Prognosis on selected Markets

Commentary

Italy

- Historically (pre-2015) market growth has been limited by cost-containment measures and greater use of generics in the retail sector and regional spending curbs from 2012 in the hospital sector.
- The launch of innovative specialty drugs, and the development of direct-to-patient (DPC) distribution of Class A specialty drugs through hospital pharmacies as part of regional cost-containment strategies, provided a boost to hospital sector growth in 2015-2019. Specifically, the introduction of innovative hepatitis C medicines in Italy since 2015 triggered a substantial spike in average prices. Price-driven market growth was further propped up following the introduction of new immuno-oncology products since in 2018.
- Faster-than-expected roll-out of the DPC channel and slow application of cost-controlling measures, like therapeutic equivalence, also contributed to the underestimation of the forecast in the 2015-2019 period.

France

- The increase in retail sector growth in 2018/2019, after a decade of minimal or negative growth, together with strong sales of new oncology drugs in the hospital sector in 2019, are the main reasons for the underestimation in both the 2015-2019 and the 2019 forecasts for France.
- Growth in France's dominant retail pharmacy sector was minimal or negative for almost a decade between 2008 and 2017, as a result of intensifying cost-containment measures implemented with the objective of reducing the social security budget deficit. Patent expiries, initiatives to encourage rational drug usage, price cuts and a push to increase generic substitution all put downward pressure on growth.
- The pressure was intensified during 2015-2017, as the government sought savings of €3.5 billion from drugs over three years. Retail sales returned to growth in 2018, as dispensing of direct-acting antivirals (DAAs) for hepatitis C and certain oncology drugs shifted from hospitals to retail pharmacies. The trend accelerated in 2019, as more hospital prescriptions – especially anti-cancers – were dispensed in retail pharmacies.

United Kingdom

- Stronger than expected hospital sector expansion is the main reason for the underestimation of the UK 2015-2019 market forecast. The dominant hospital sector, has experienced an acceleration in average price growth propelled by the launch and uptake of new and innovative medicines. However, volume growth in standard unit terms contracted in 2017-2019, reflecting the uptake of high-cost, low volume speciality medicines. Volume growth has also been curbed by the financial pressures on access to inpatient care, with waiting times for routine procedures in particular increasing rapidly.
- In the retail sector, price growth recovered considerably in 2019 compared with the near-stagnation trends witnessed 2016-2018, with significant price per standard unit increases registered for several unbranded drugs, including naproxen, losartan, prednisolone, omeprazole and co-codamol; the increase can be attributed to a range of such causes as product shortages, Brexit stockpiling, and implementation of the falsified medicines directive.

Market Prognosis on selected Markets

Commentary

Germany

- The German pharmaceutical market witnessed faster than expected growth in the 2015-2019 period, mainly as a result of strong average price growth.
- Retail sector price growth has driven by the greater use of innovative drug groups, in particular hepatitis C virus (HCV) treatments. Sales growth averaged 4.9% between 2015 and 2019; with sales in 2019 driven mainly by the use of high-cost monoclonal antibody antineoplastics, viral vaccines, and anti-inflammatory products.
- The trend is similar in the hospital sector, where robust price growth was witnessed in 2018-2019 reflecting the increasing use of higher-priced therapies, including monoclonal antibody antineoplastics and multiple sclerosis products.
- Back data amendments to the MIDAS data including panel redesign of hospital audit also contributed to the underestimation of the forecast y Hospital audit in order to better account for the changes in local market dynamics.

Brazil

- The underestimation in 2015-2019 can be attributed to several factors. In 2015-2016 Brazil experienced a deep economic recession and as employment and household spending fell significantly in 2016, a much stronger decline in out-of-pocket spending was predicted. The change in the political landscape since 2016, following years of expansionary populist healthcare programmes and high levels of public spending (up to 2015) was also key assumption for forecasting lower healthcare expenditure. The entry of a new centrist government at the end of 2016, followed the right-wing conservative government in January 2019, both focused on cost-containment, reducing healthcare budgets and funding for healthcare programmes.
- For decades the Pharmaceutical Market Regulatory Agency (CMED) controlled prices by setting maximum price increases below inflation. For the first time in 2016, CMED authorized a price hike cap of 12.5%, exceeding the inflation rate of 10.7% recorded in 2015. This positive unforeseen price adjustment led to sales growth in 2016. However, CMED reverted back to limiting price hikes at below inflation as inflation decelerated and the economy recovered. As of 2018 the economy had recovered much stronger than expected, driving solid growth in the private health sector and out-of-pocket sales, which continued in 2019.

Spain

- Hospital sales growth in Spain accelerated in 2015, driven by an improving macroeconomic environment as well as the introduction of new product launches. The launch of premium-priced hepatitis C antivirals, Harvoni (ledipasvir + sofosbuvir) and Sovaldi (sofosbuvir) in particular, resulted in a sharp increase in hospital sales in 2015.
- Retail sales grew strongly in 2016 mainly due to a lack of control on expenditure resulting from the political gridlock in late 2015 and 2016. A return to more modest growth of was witnessed in 2017-2019.
- The political instability in Spain over the past four years has delayed the approval of the draft Royal Decree on Regulating the Financing and Pricing of Drugs and Medical Devices, which was expected to curb overall rates of market growth. The ineffectiveness of measures aimed at limiting annual public pharmaceutical expenditure growth in line with GDP growth since 2015 also contributed to the underestimation of the forecast.
- A major redesign of the hospital panel led to significant back data changes to the MIDAS data, which ultimately led to the market size being underestimated in 2015-2019.

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
+ Dominican Republic
+ Ecuador
+ Egypt
+ Estonia
+ Germany
+ Hong Kong
+ Italy

Retail (Sell-in)

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

Hospital (Sell-in)

+ Austria
+ Canada
+ Philippines
+ South Korea
+ Spain

Combined (Sell-in)

+ Bosnia
+ Croatia
+ Czech Republic
+ Hungary
+ Indonesia
+ Kazakhstan
+ Poland
+ Russia
+ Serbia
+ Slovakia
+ Slovenia
+ Switzerland
+ USA
+ Vietnam

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
+ Spain
+ Switzerland

Other (Sell-out)

Retail

+ France
+ Germany
+ Greece
+ United Kingdom

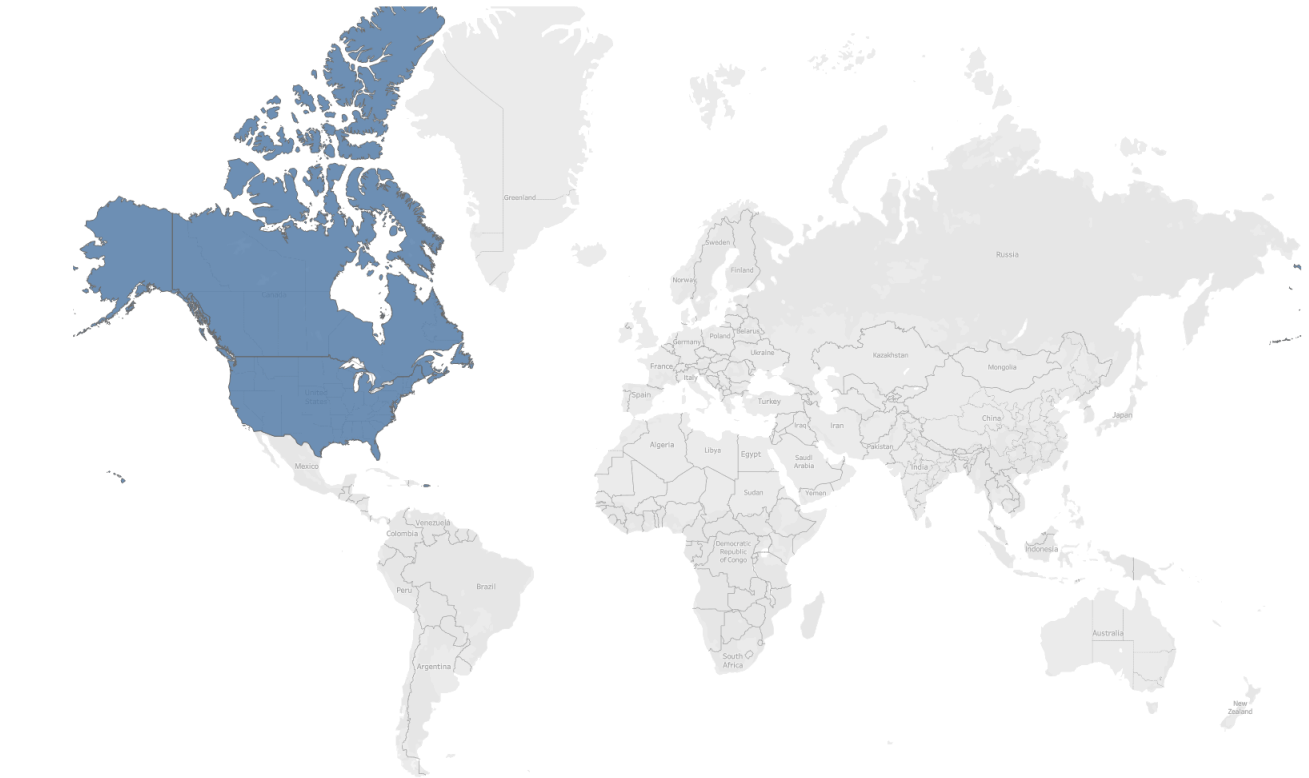
PharmaTrend

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

Hospital

+ Germany
+ Italy
+ United Kingdom

United States of America + Canada



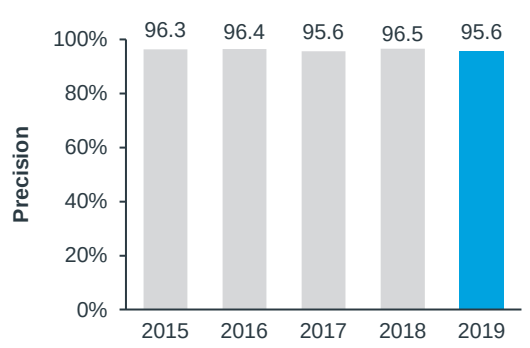
Countries
United States of America
Canada

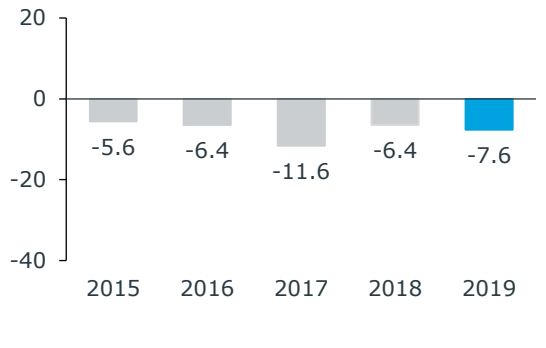
USA Retail + Non-Retail Validation Study

2019 Validation Study

Validation Results

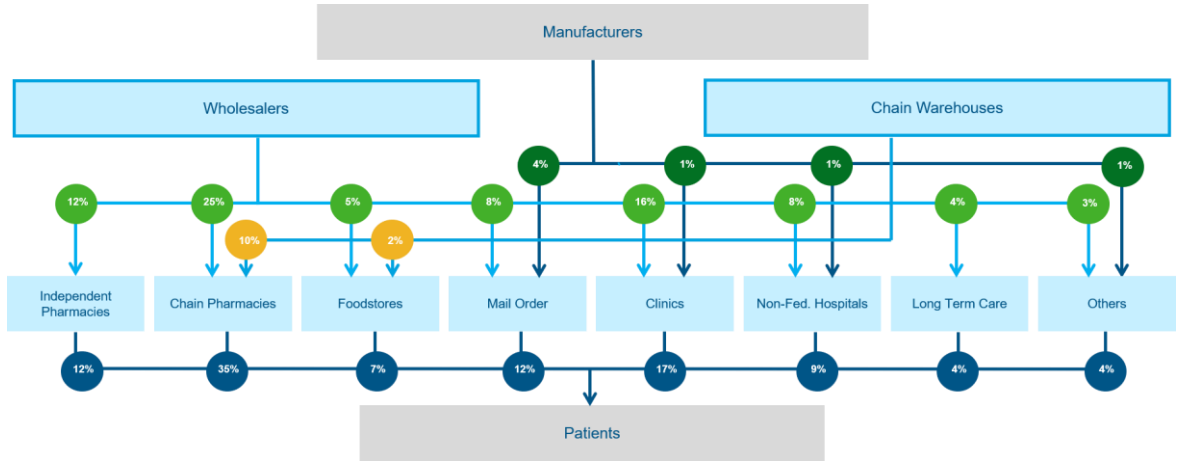
Precision	95.6%	Bias	-7.6%





Outcomes	• Overall precision index declined by 0.9 percentage points in 2019; • Overall underestimation increased by 1.2 percentage points in 2019; • Negative bias is expected due to supplier blocking of sales including federal government accounts and manufacturer-requested products and facilities.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
71 *(-2 vPY)*	**1,300** *(-84 vPY)*	**83%** *(-3% Vpy)*

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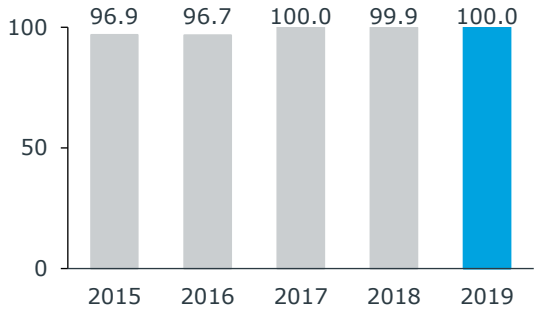
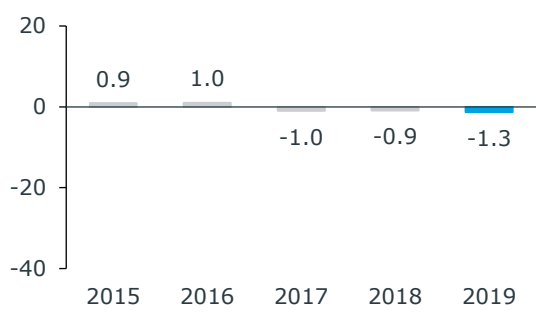
Canada Retail Validation Study

2019 Validation Study

Validation Results

Precision	100%	Bias	-1.3%

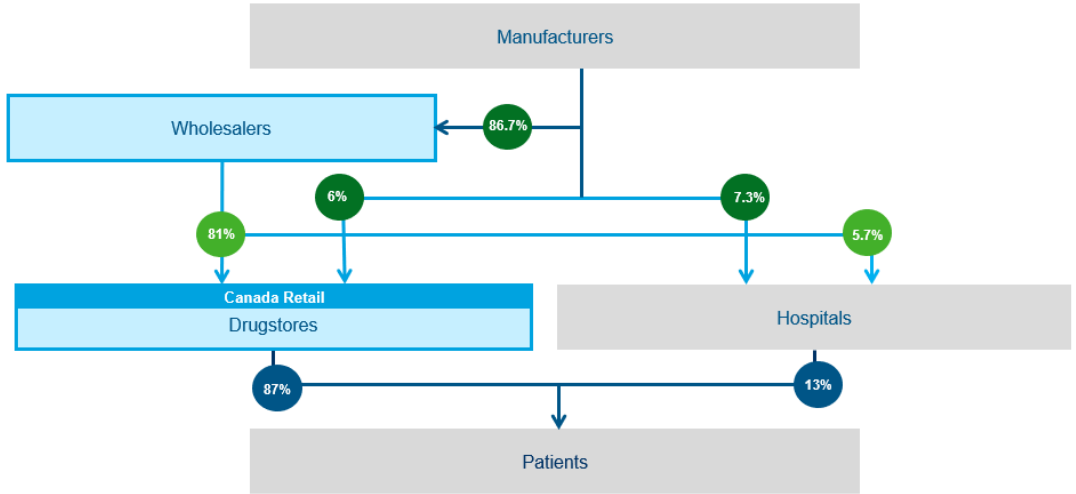




Outcomes

- Overall precision index improved by 0.01 percentage points in 2019;
- Overall underestimation increased by 0.4 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
258 *(-1 vPY)*	**6,215** *(-192 vPY)*	**95%** *(no change vPY)*

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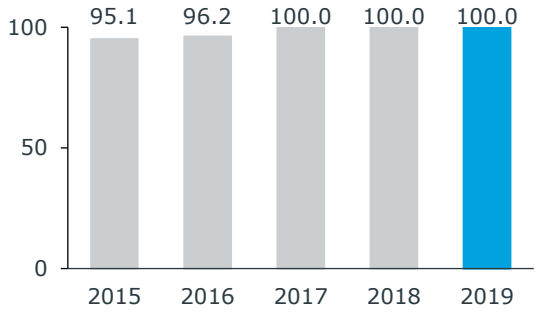
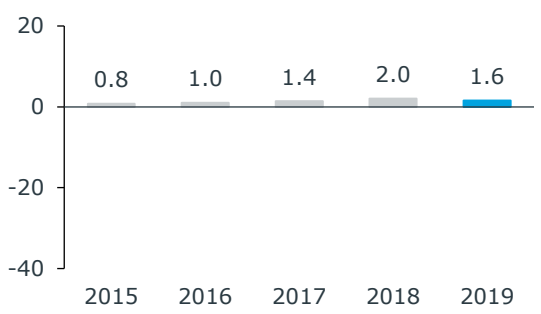
Canada OTC Validation Study

2019 Validation Study

Validation Results

Precision	100%	Bias	1.6%

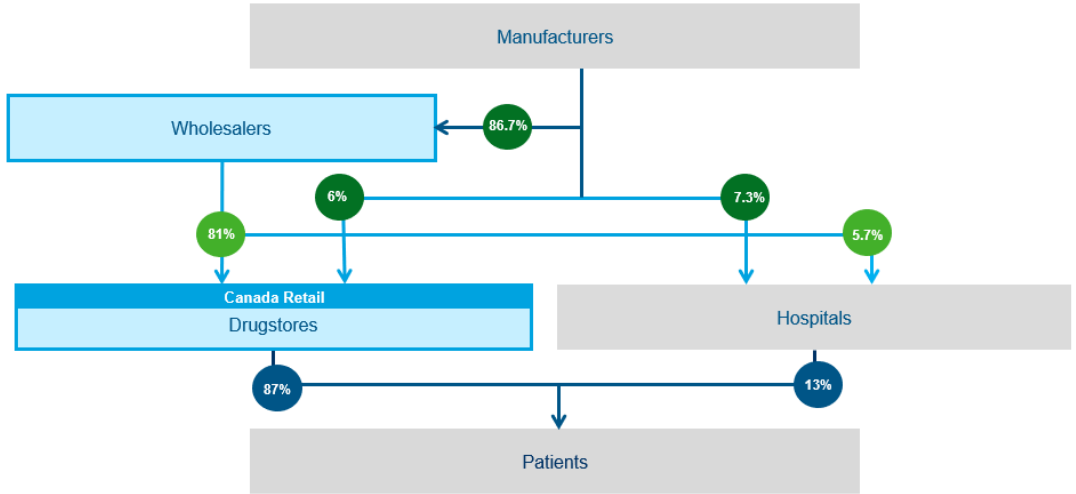




Outcomes

- Overall precision index remained unchanged at 100% in 2019;
- Overall underestimation improved by 0.4 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
166 *(-1 vPY)*	**3,029** *(-98 vPY)*	**95%** *(no change vPY)*

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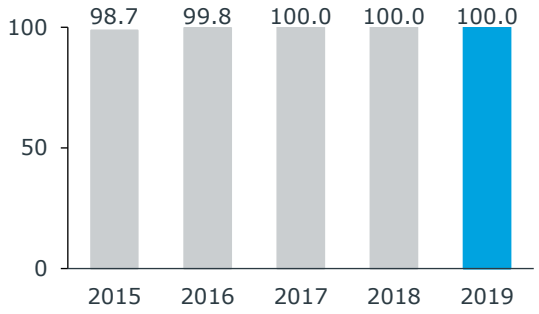
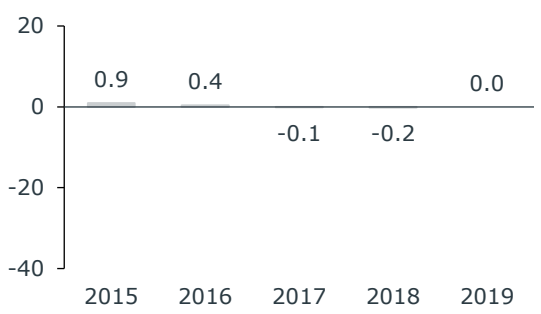
Canada Hospital Validation Study

2019 Validation Study

Validation Results

Precision	100%	Bias	0.0%

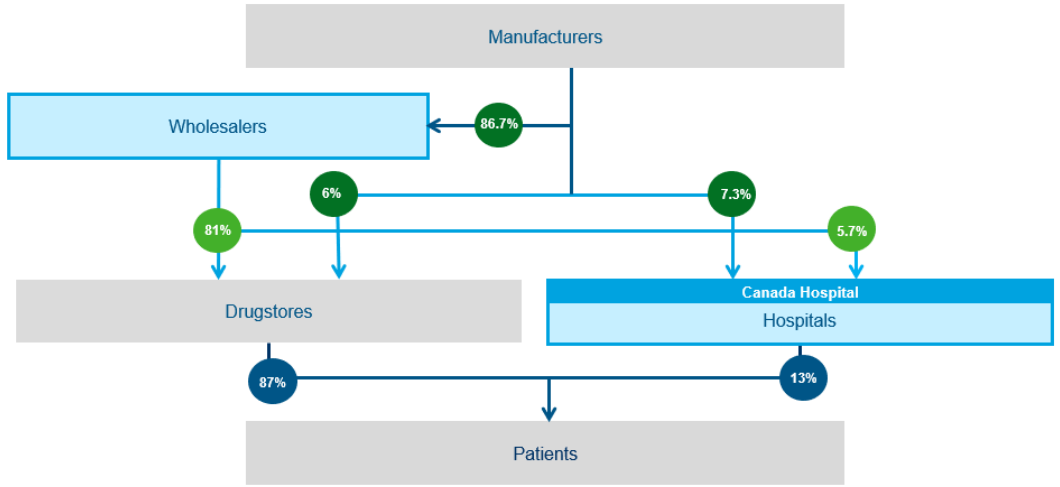




Outcomes

- Overall precision index remained unchanged in 2019;
- Overall underestimation improved to no bias in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
118 *(+8 vPY)*	**1,199** *(-25 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	

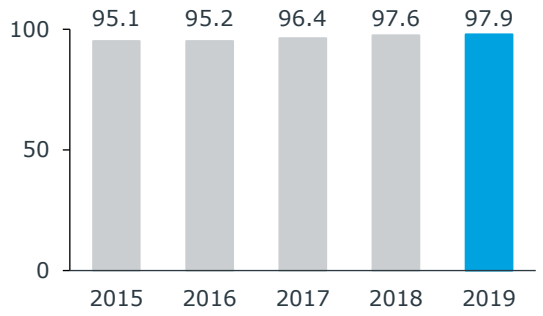
Back

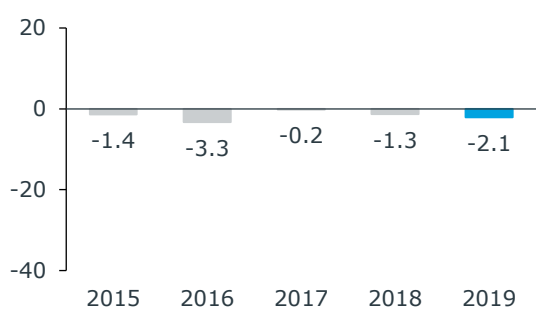
Argentina Retail Validation Study

2019 Validation Study

Validation Results

Precision	97.9%	Bias	-2.1%

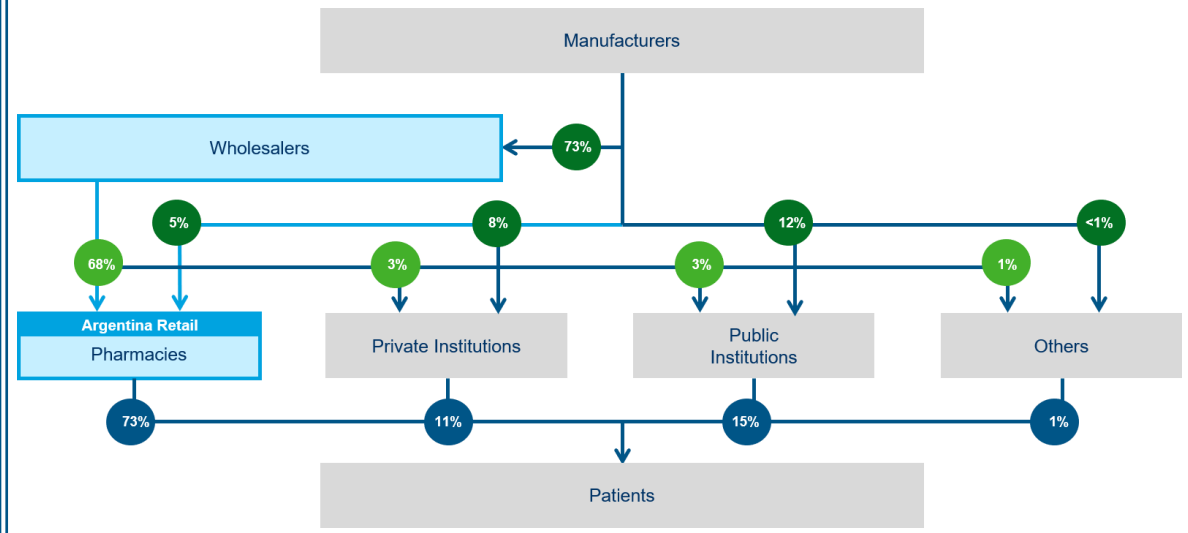




Outcomes

- Overall precision index improved by 0.3 percentage points in 2019;
- Overall underestimation increased by 0.8 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
25 *(-12 vPY)*	**1,620** *(-486 vPY)*	**36%** *(-9% vPY)*

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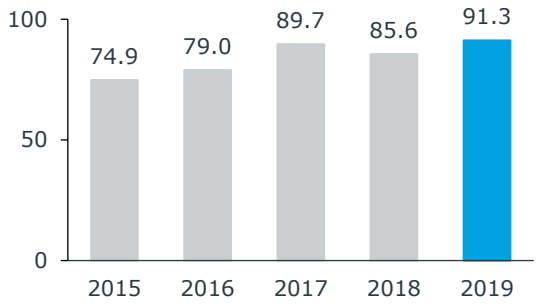
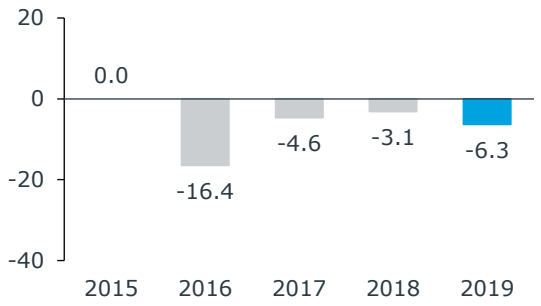
Argentina OTC Validation Study

2019 Validation Study

Validation Results

Precision	91.3%	Bias	-6.3%

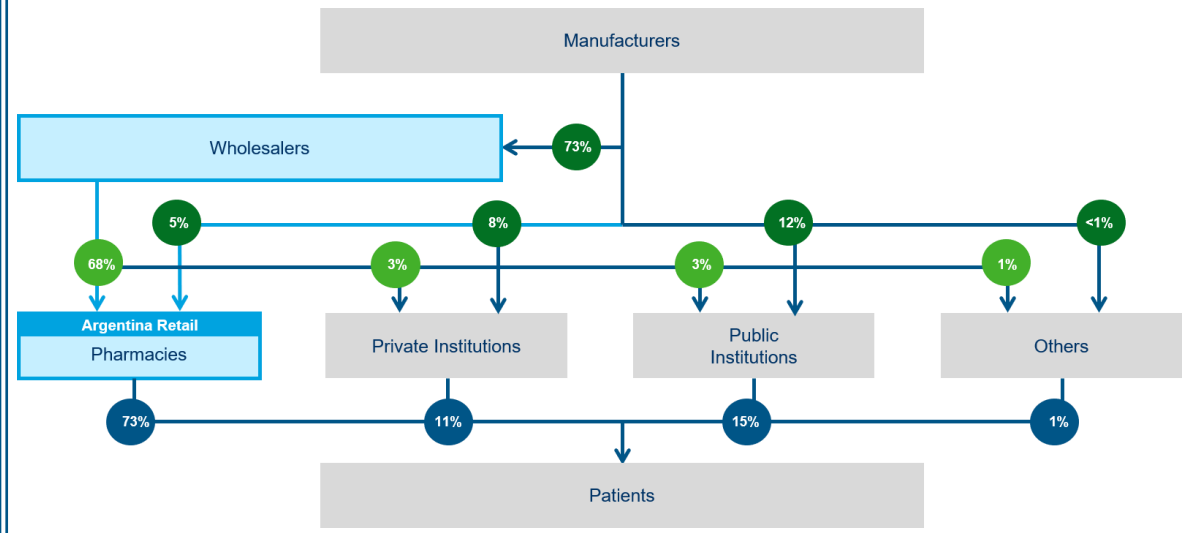




Outcomes

- Overall precision index improved by 5.7 percentage points in 2019;
- Overall underestimation increased by 3.2 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
15 *(-8 vPY)*	**169** *(-41 vPY)*	**18%** *(no change vPY)*

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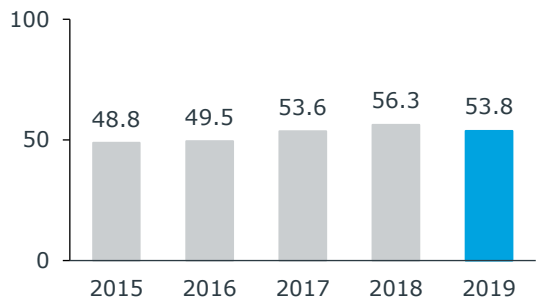
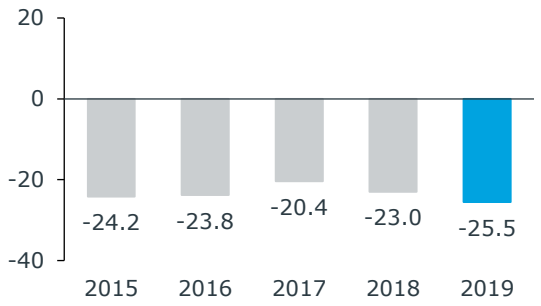
Bolivia Retail Validation Study

2019 Validation Study

Validation Results

Precision	53.8%	Bias	-25.5%

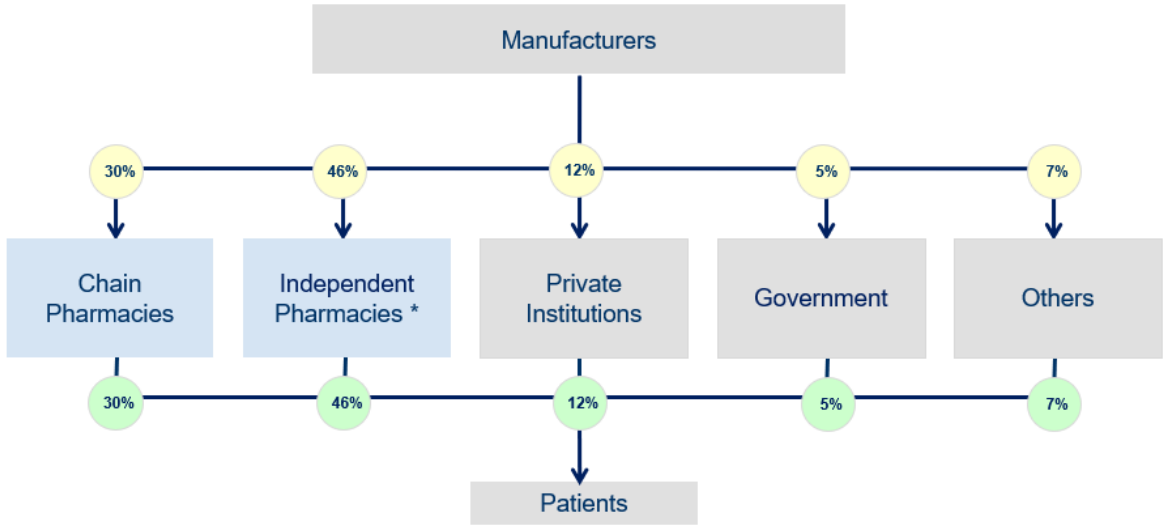




Outcomes

- Overall precision index declined by 2.5 percentage points in 2019;
- Overall underestimation increased by 2.5 percentage points in 2019;
- To fulfill the sample design.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
39 *(-4 vPY)*	**1,621** *(+28 vPY)*	**59%** *(-1% vPY)*

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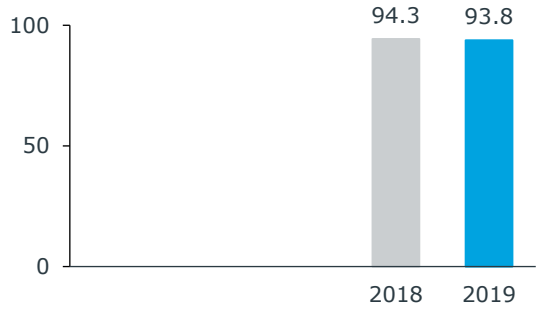
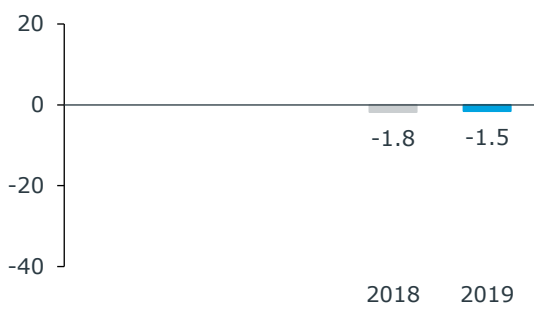
Brazil Retail Validation Study

2019 Validation Study

Validation Results

Precision	93.8%	Bias	-1.5%

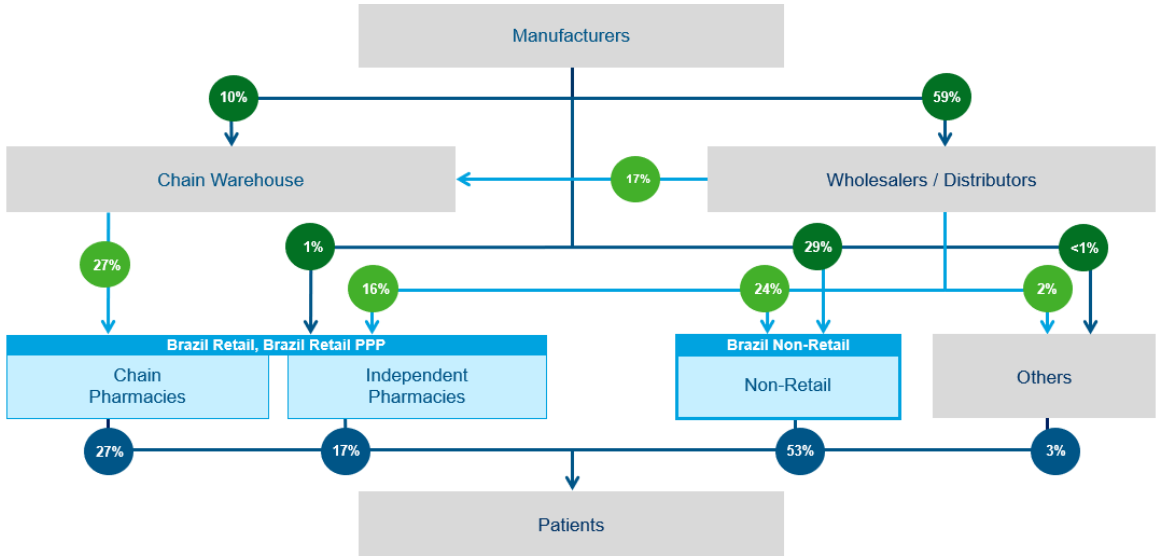




Outcomes

- Overall precision index declined by 0.5 percentage points in 2019;
- Overall underestimation improved by 0.3 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
20 *(-13 vPY)*	**1,306** *(-1,147 vPY)*	**15%** *(-21% vPY)*

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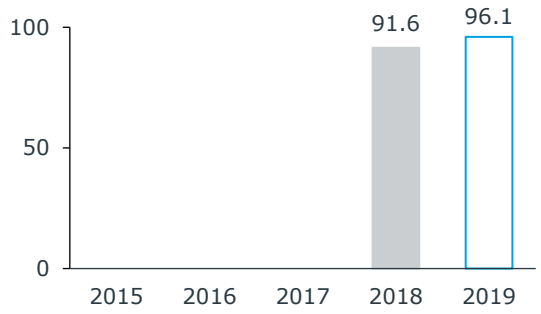
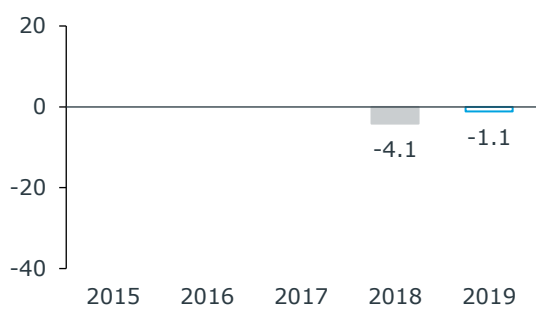
Brazil OTC Validation Study

2019 Validation Study

Validation Results

Precision	96.1%	Bias	-1.1%

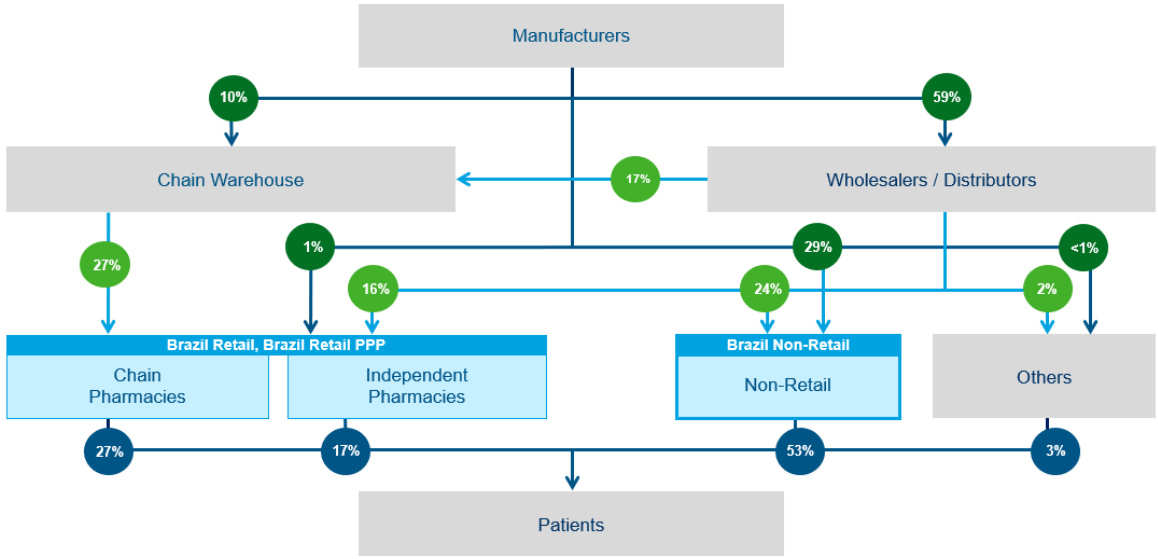




Outcomes

- Overall precision index improved by 4.5 percentage points in 2019;
- Overall underestimation improved by 3 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(-13 vPY)*	**189** *(-318 vPY)*	**6%** *(-22% vPY)*

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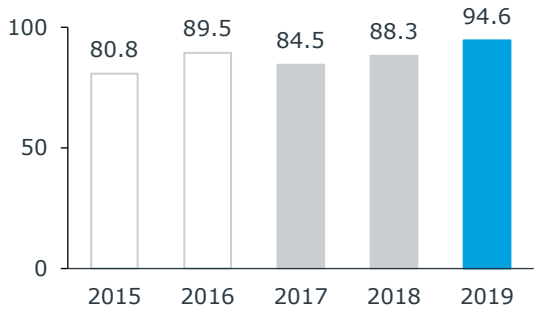
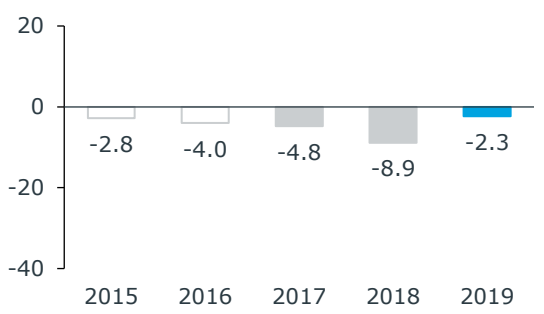
Central America Retail Validation Study

2019 Validation Study

Validation Results

Precision	94.6%	Bias	-2.3%

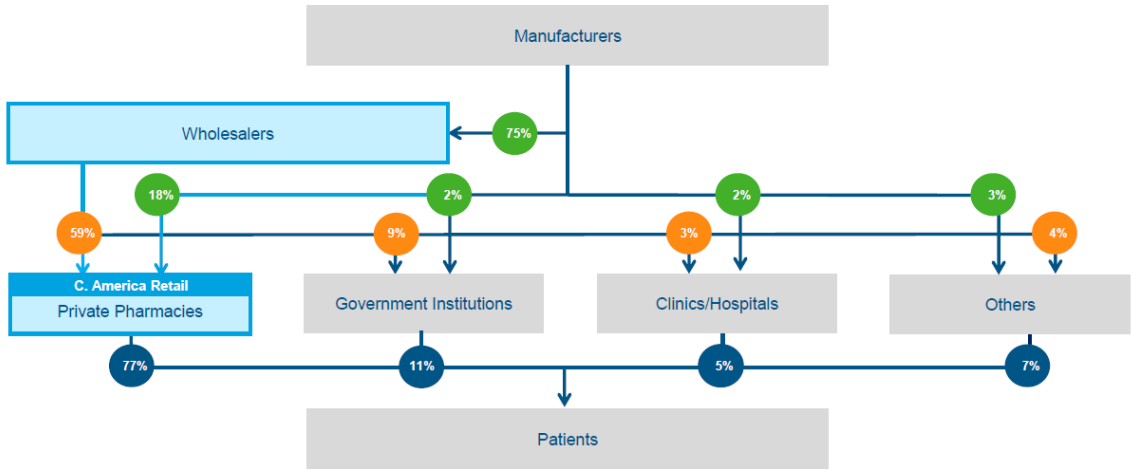




Outcomes

- Overall precision index improved by 6.3 percentage points in 2019;
- Overall underestimation improved by 6.6 percentage points in 2019;
- Update Channel Survey and review projection level.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(-9 vPY)*	**804** *(-615 vPY)*	**11%** *(-13% vPY)*

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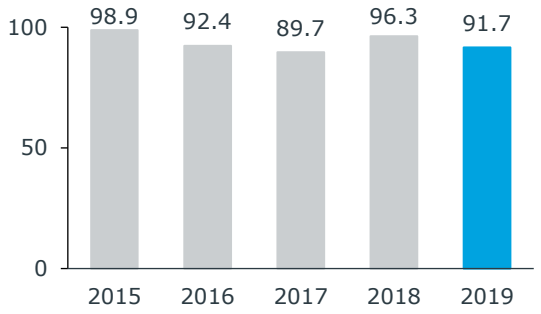
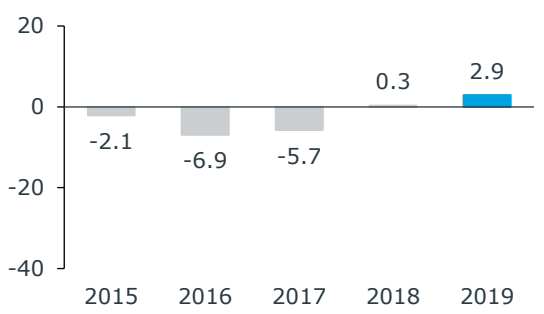
Chile Retail Validation Study

2019 Validation Study

Validation Results

Precision	91.7%	Bias	2.9%

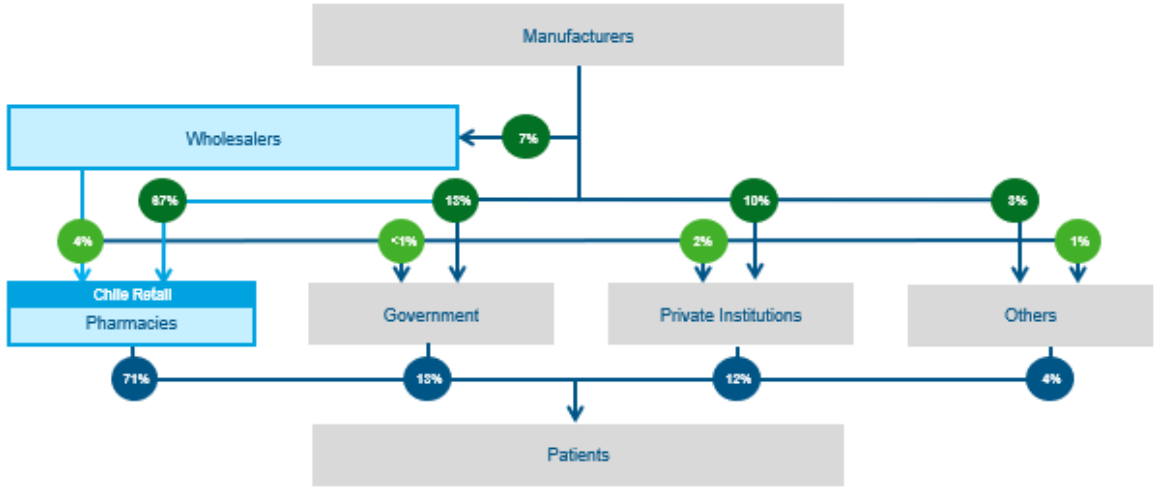




Outcomes

- Overall precision index declined by 4.6 percentage points in 2019;
- Overall overestimation increased by 2.6 percentage points in 2019;
- Develop projection methodology.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
13 *(+2 vPY)*	**564** *(-15 vPY)*	**11%** *(-1% vPY)*

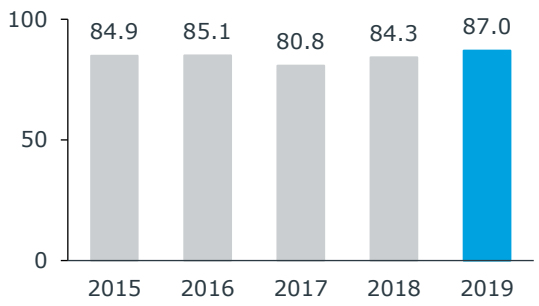
Back

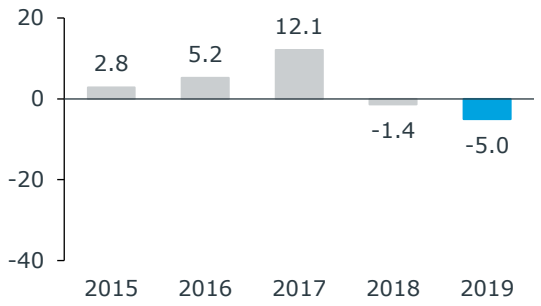
Colombia Retail Validation Study

2019 Validation Study

Validation Results

Precision	87.0%	Bias	-5.0%

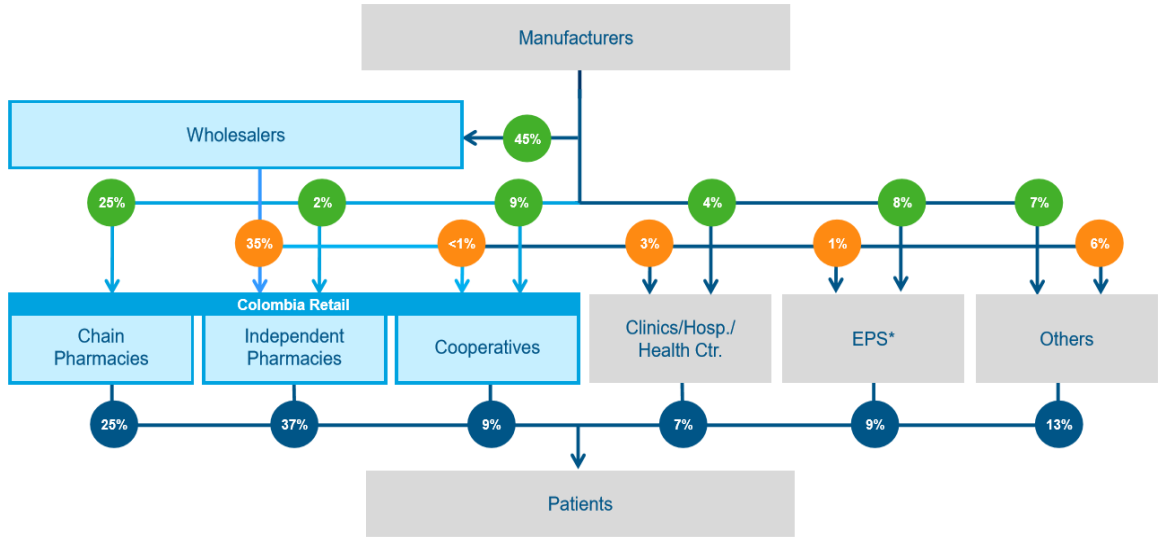




Outcomes

- Overall precision index improved by 2.7 percentage points in 2019;
- Overall underestimation increased by 3.6 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
32 *(+14 vPY)*	**1,247** *(+376 vPY)*	**28%** *(+10% vPY)*

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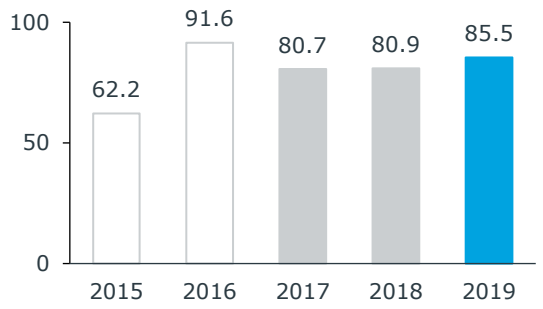
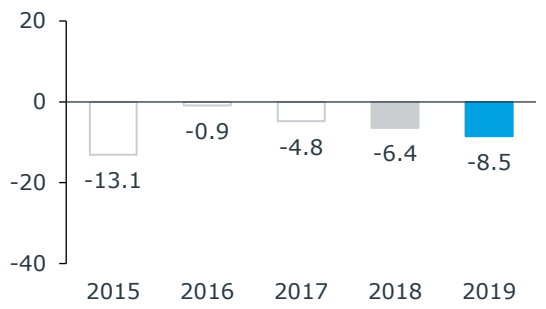
Dominican Republic Retail Validation Study

2019 Validation Study

Validation Results

Precision	85.5%	Bias	-8.5%

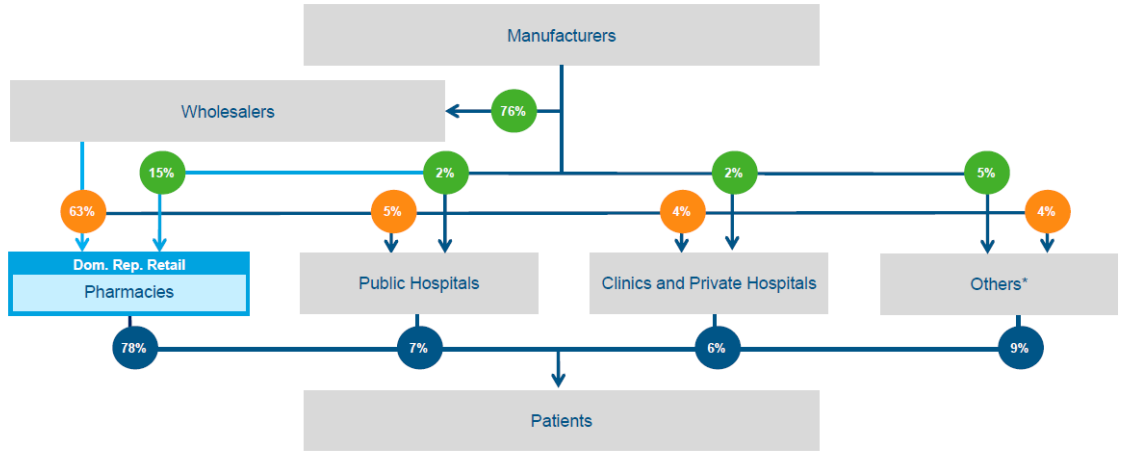




Outcomes

- Overall precision index improved by 4.6 percentage points in 2019;
- Overall underestimation increased by 2.1 percentage points in 2019;
- Update Channel Survey and review projection structure

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(No Change vPY)*	**641** *(-420 vPY)*	**10%** *(-6% vPY)*

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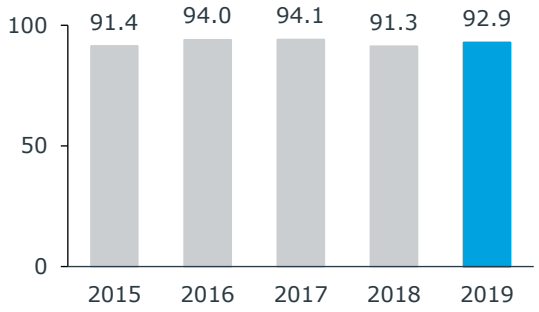
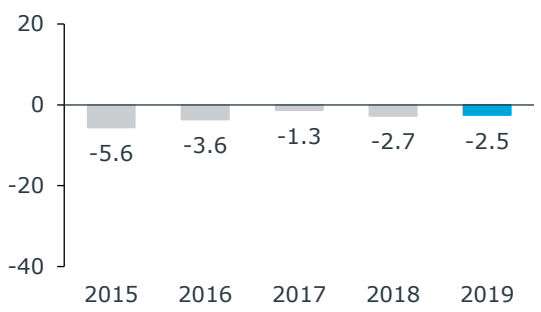
Ecuador Retail Validation Study

2019 Validation Study

Validation Results

Precision	92.9%	Bias	-2.5%

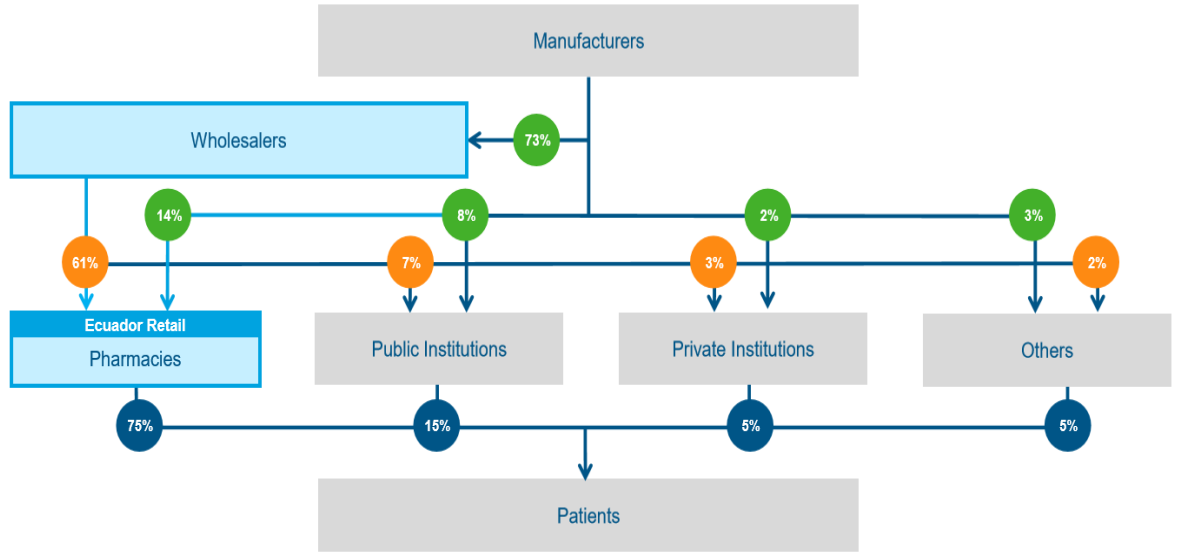




Outcomes

- Overall precision index improved by 1.6 percentage points in 2019;
- Overall underestimation improved by 0.2 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
49 *(-14 vPY)*	**1,731** *(-104 vPY)*	**53%** *(-1% vPY)*

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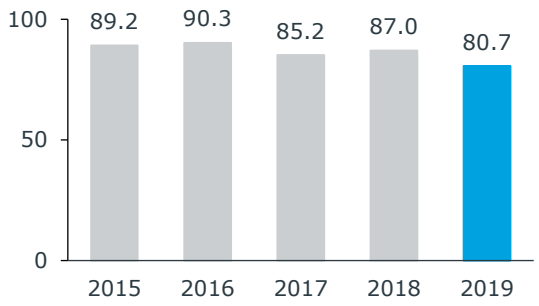
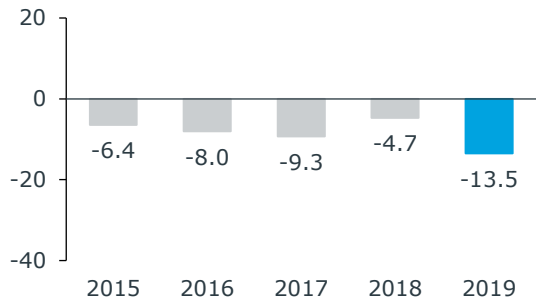
Mexico Retail Validation Study

2019 Validation Study

Validation Results

Precision	80.7%	Bias	-13.5%

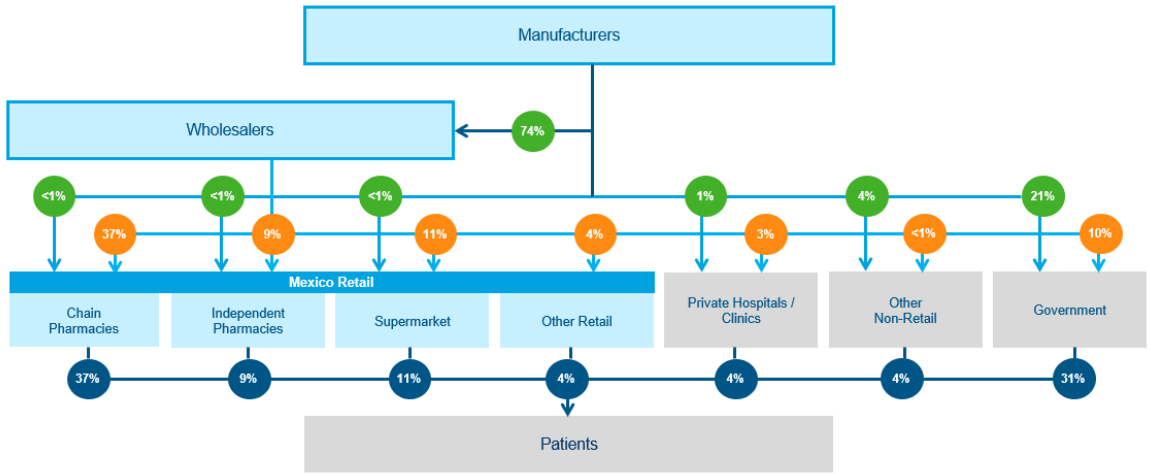




Outcomes

- Overall precision index declined by 6.3 percentage points in 2019;
- Overall underestimation increased by 8.8 percentage points in 2019;
- Review projection structure.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
29 *(+6 vPY)*	**962** *(-18 vPY)*	**14%** *(+1% vPY)*

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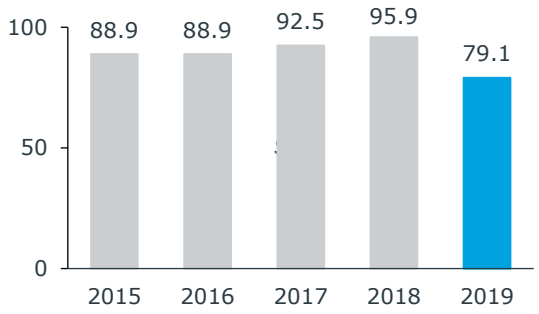
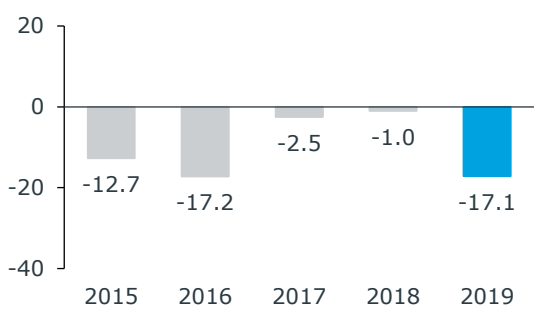
Mexico OTC Validation Study

2019 Validation Study

Validation Results

Precision	79.1%	Bias	-17.1%

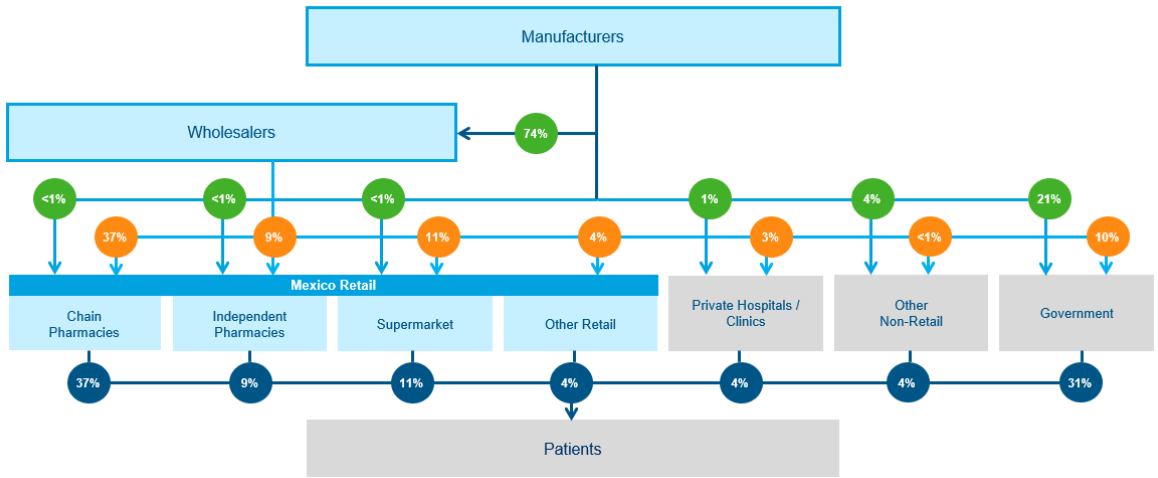




Outcomes

- Overall precision index declined by 16.8 percentage points in 2019;
- Overall underestimation increased by 16.1 percentage points in 2019;
- Review projection structure.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
9 *(+3 vPY)*	**156** *(+32 vPY)*	**10%** *(+2 vPY)*

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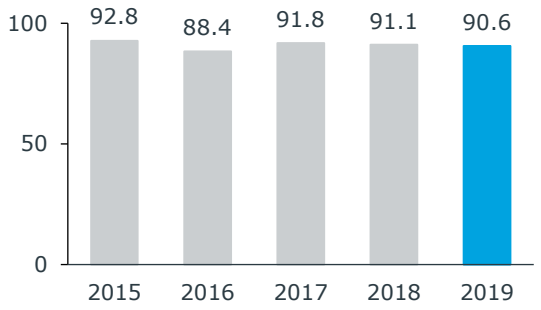
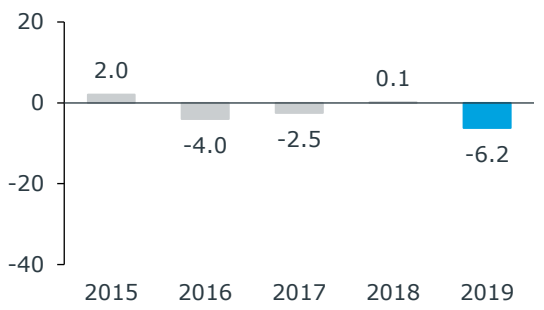
Peru Retail Validation Study

2019 Validation Study

Validation Results

Precision	90.6%	Bias	-6.2%

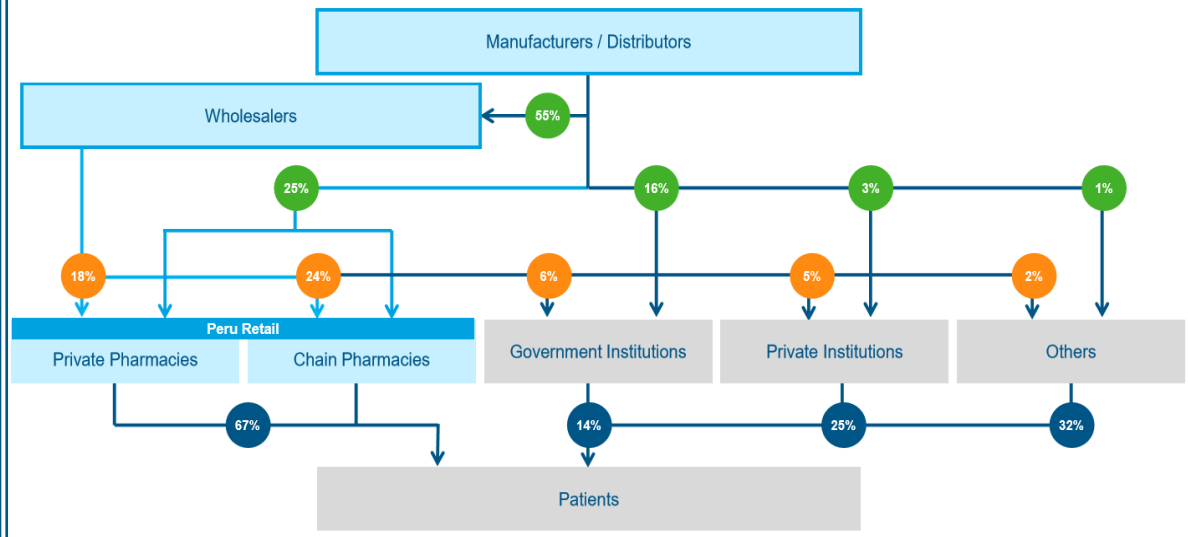




Outcomes

- Overall precision index declined by 0.5 percentage points in 2019;
- Overall bias turned from 0.1% overestimation in 2018 to 6.2% underestimation in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(-4 vPY)*	**884** *(-267 vPY)*	**36%** *(-3% vPY)*

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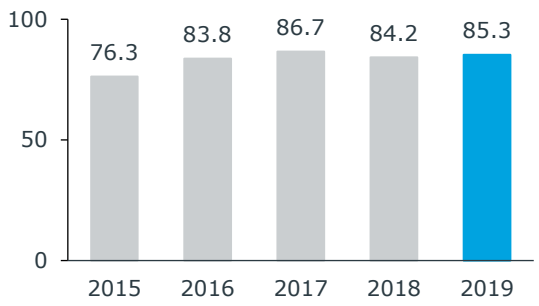
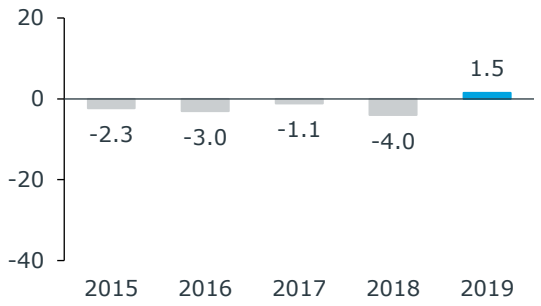
Uruguay Retail+Mutuales Validation Study

2019 Validation Study

Validation Results

Precision	85.3%	Bias	1.5%

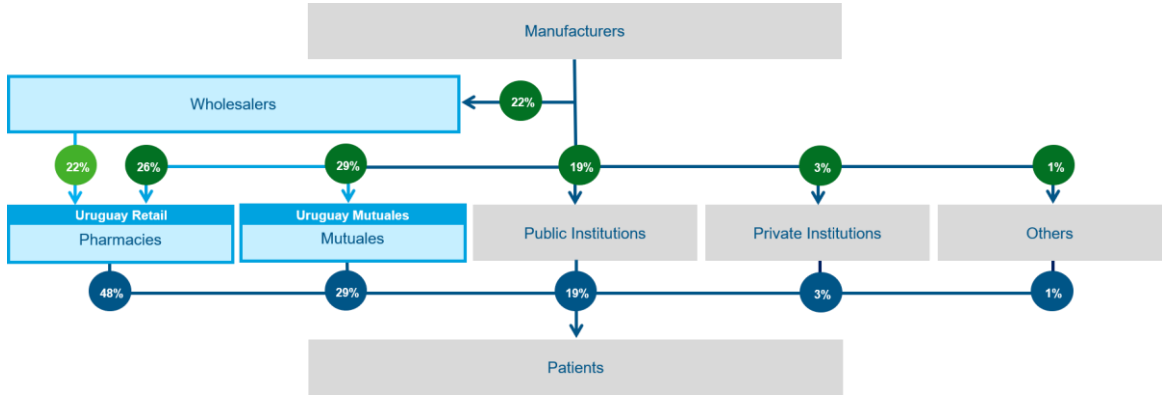




Outcomes

- Overall precision index improved by 1.1 percentage points in 2019;
- Overall bias turned from 4% underestimation to 1.5% overestimation in 2019;
- Review internal processes. Fulfill LAU sample design.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(+1 vPY)*	**825** *(+109 vPY)*	**47%** *(+4% vPY)*

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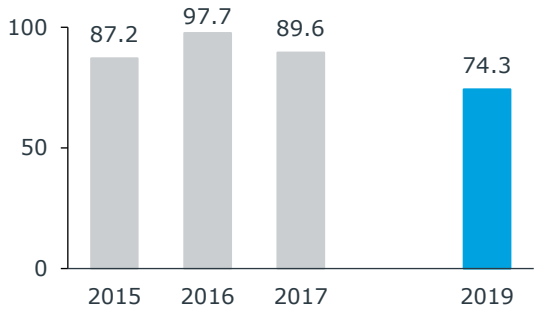
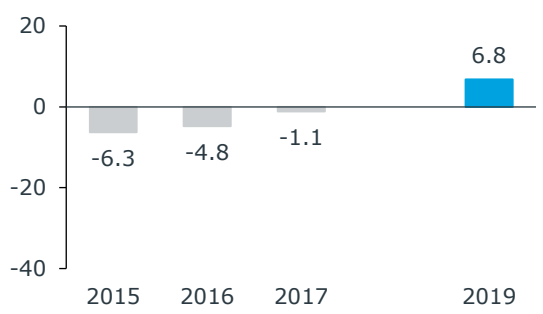
Venezuela Retail Validation Study

2019 Validation Study

Validation Results

Precision	74.3%	Bias	6.8%

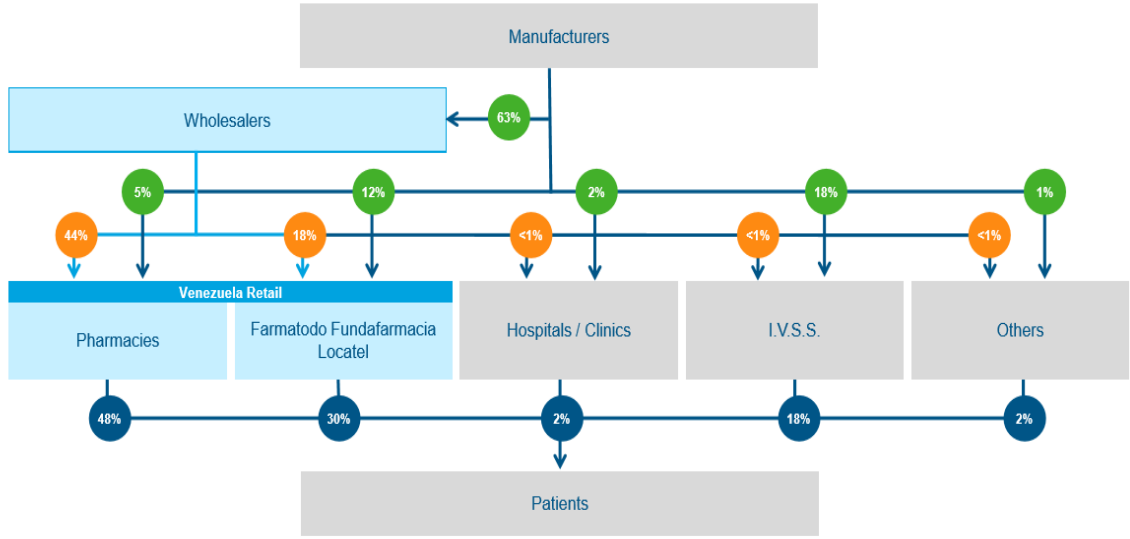




Outcomes

- Overall precision index declined by 15.3 percentage points in 2019
- Overall bias turned from 1.1% underestimation in 2017 to 6.8% overestimation in 2019
- To review projection level

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
24 *(+7 v2017)*	**371** *(+11 v2017)*	**31%** *(+2% v2017)*

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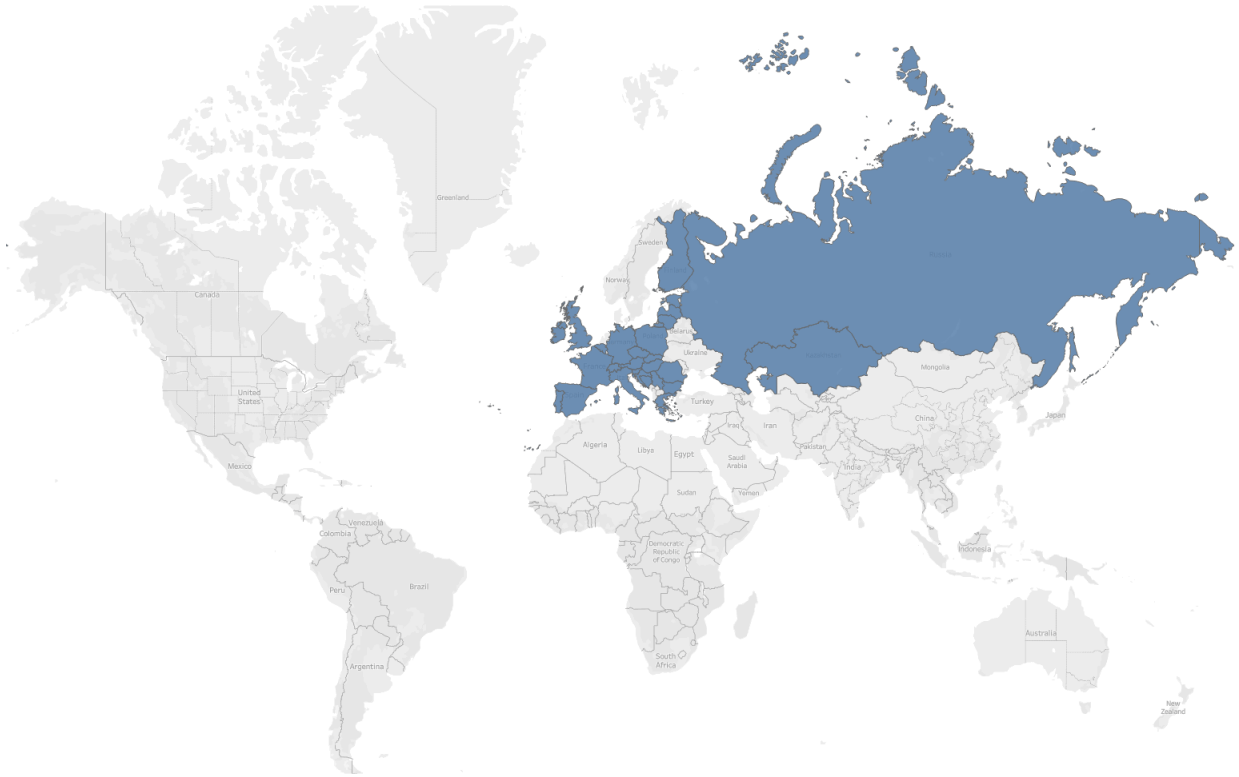
Europe



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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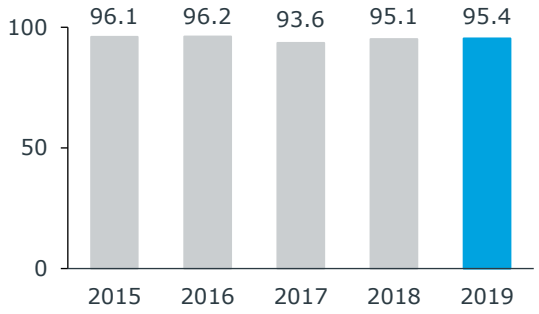
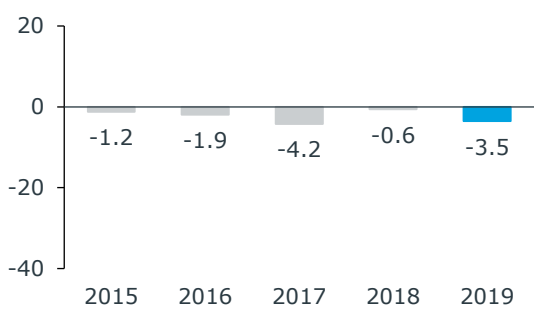
Austria Retail Validation Study

2019 Validation Study

Validation Results

Precision	95.4%	Bias	-3.5%

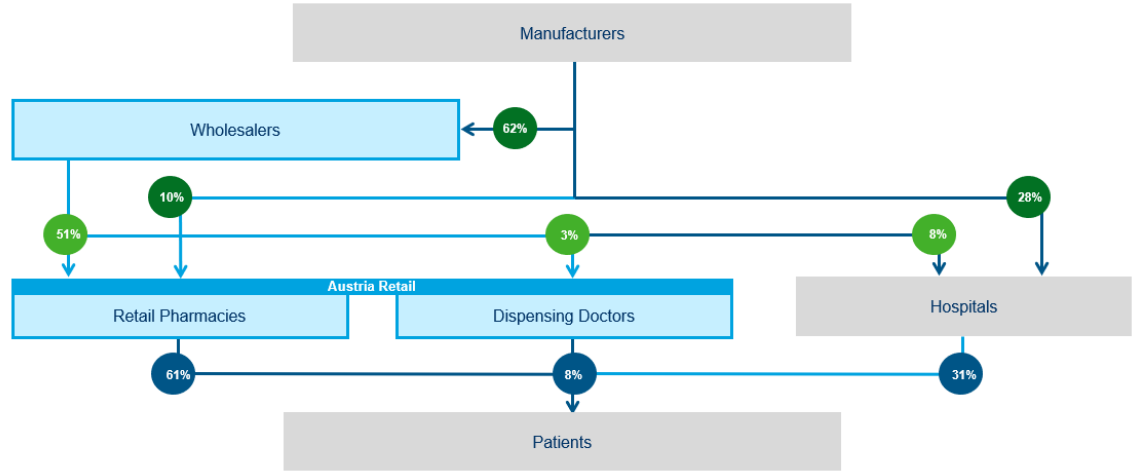




Outcomes

- Overall precision index improved by 0.3 percentage points in 2019;
- Overall underestimation increased by 2.9 percentage points in 2019;
- Analyze root cause for bias increase and implement measures for improvement.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
17 *(-1 vPY)*	**577** *(-219 vPY)*	**18%** *(-7% vPY)*

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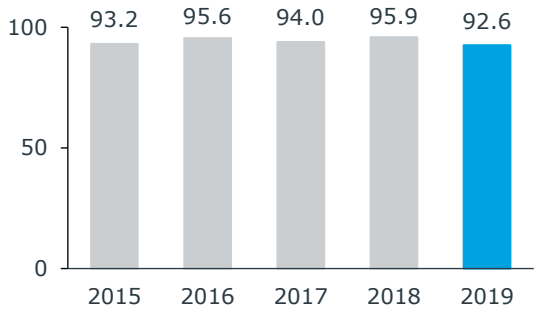
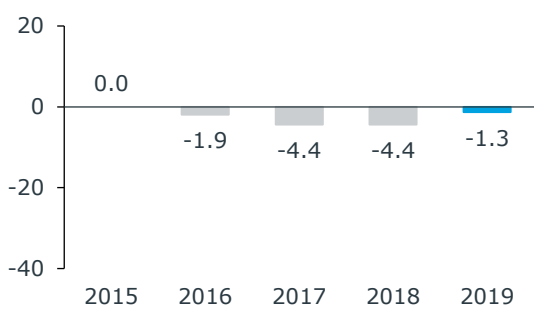
Austria PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	92.6%	Bias	-1.3%

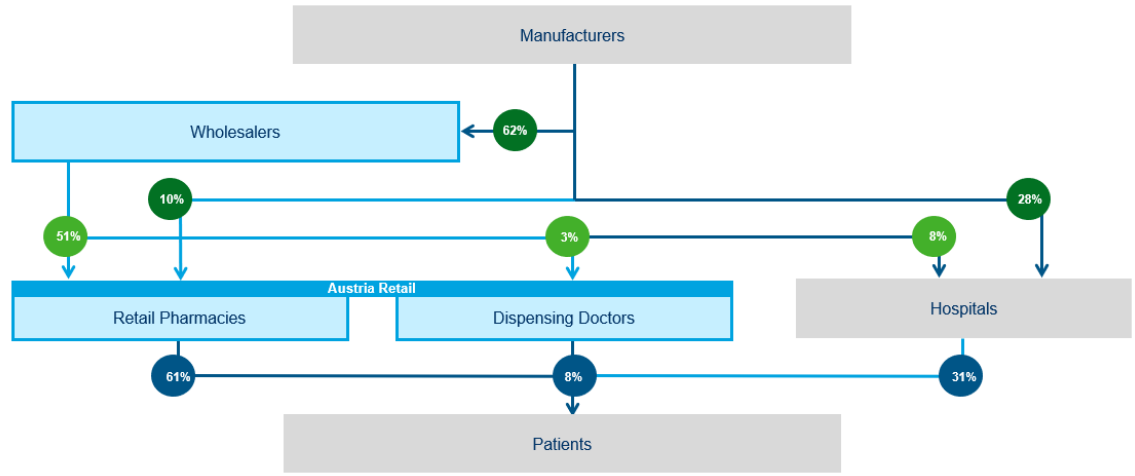




Outcomes

- Overall precision index declined by 3.3 percentage points in 2019
- Overall underestimation improved by 3.1 percentage points in 2019
- To update and implement new universe and increase pharmacy panel

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
17 *(-1 vPY)*	**575** *(-159 vPY)*	**14%** *(-4% vPY)*

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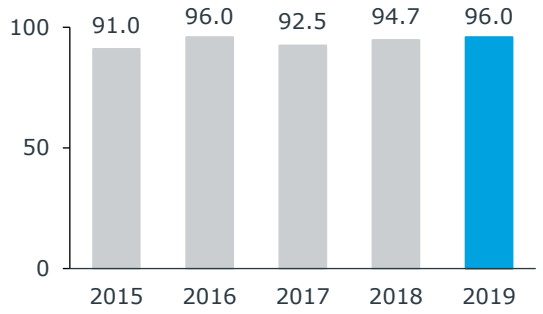
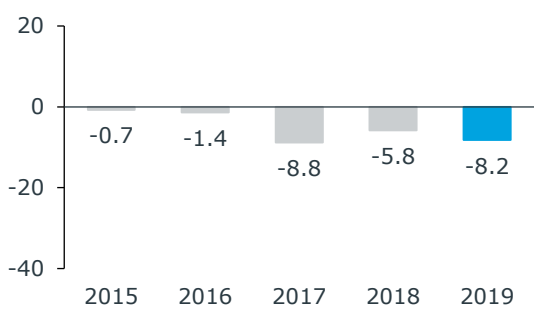
Austria OTC Validation Study

2019 Validation Study

Validation Results

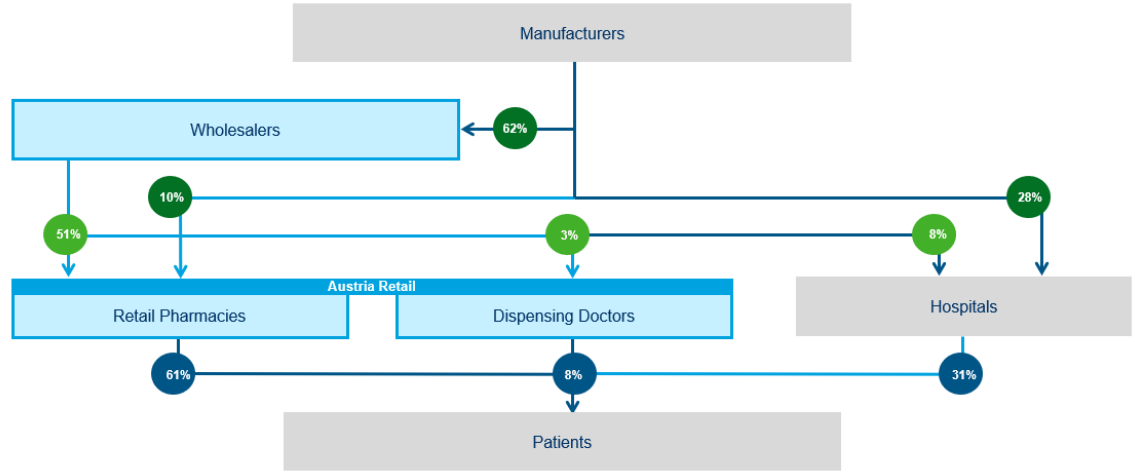
Precision	96.0%	Bias	-8.2%





Outcomes	• Overall precision index improved by 1.3 percentage points in 2019 • Overall underestimation increased by 2.4 percentage points in 2019 • To update and implement new universe and increase pharmacy panel

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
7 *(-2 vPY)*	**84** *(-44 vPY)*	**18%** *(-10% vPY)*

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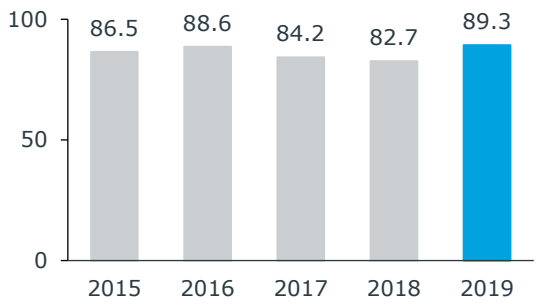
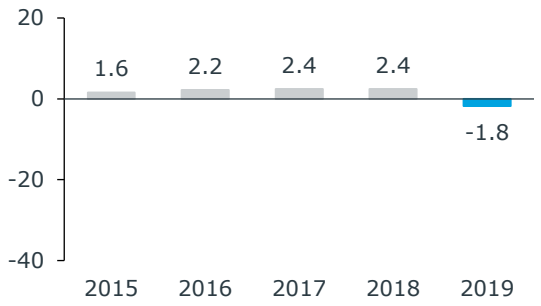
Austria Hospital Validation Study

2019 Validation Study

Validation Results

Precision	89.3%	Bias	-1.8%

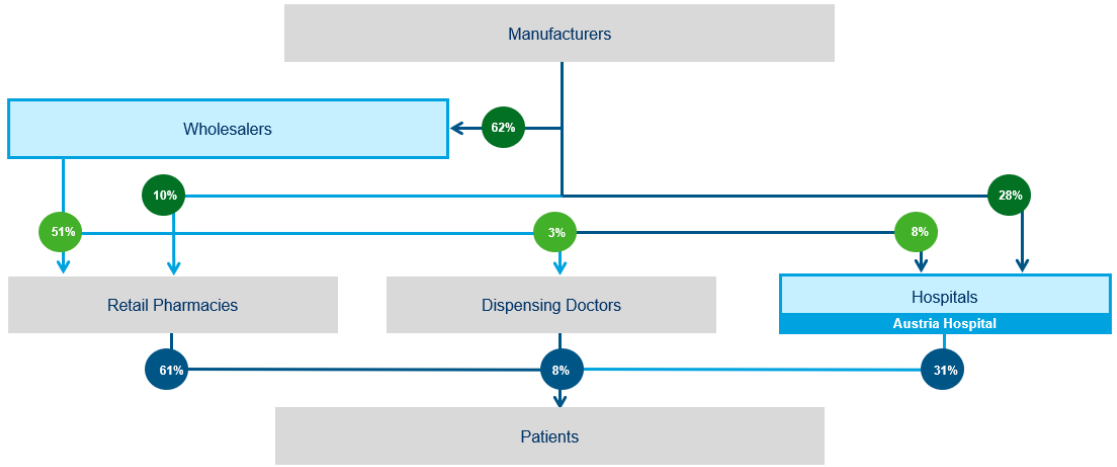




Outcomes

- Overall precision index improved by 6.6 percentage points in 2019;
- Overall bias turned from 2.4% overestimation to 1.8% underestimation in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
10 *(no change vPY)*	**363** *(+5 vPY)*	**21%** *(-1 vPY)*

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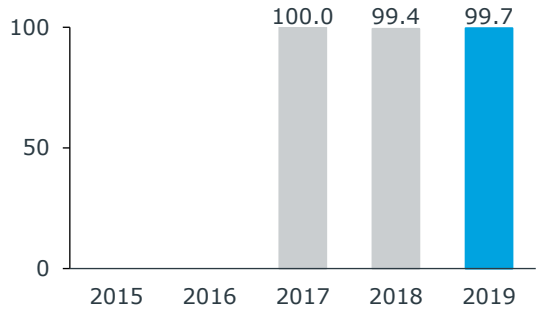
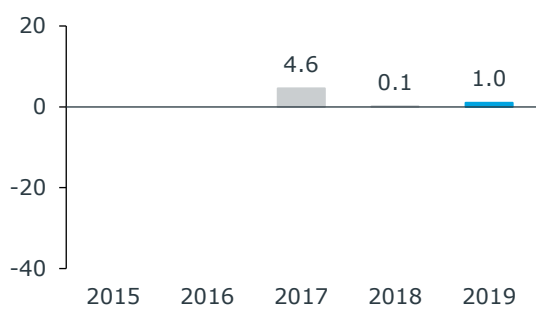
Bosnia Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	99.7%	Bias	1.0%

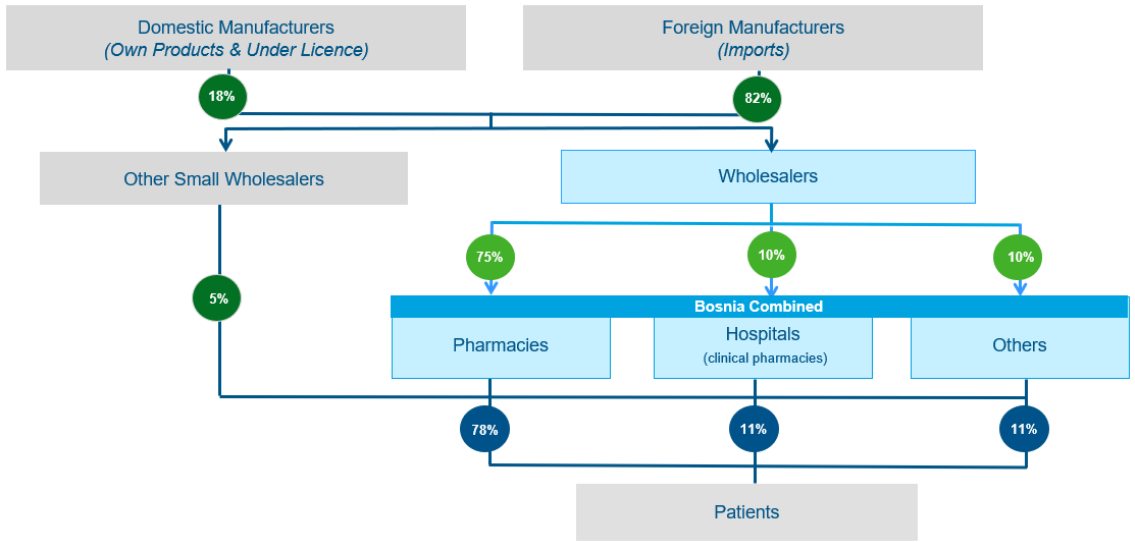




Outcomes

- Overall precision index improved by 0.3 percentage points in 2019;
- Overall overestimation increased by 0.9 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
15 *(+1 vPY)*	**562** *(+8 vPY)*	**46%** *(+2% vPY)*

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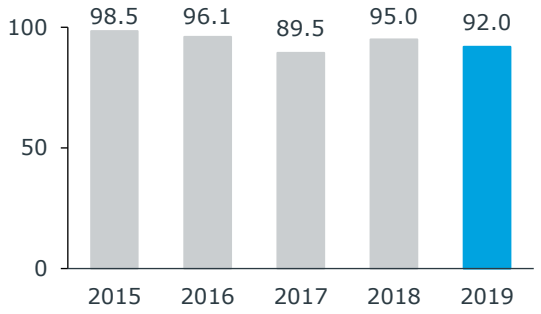
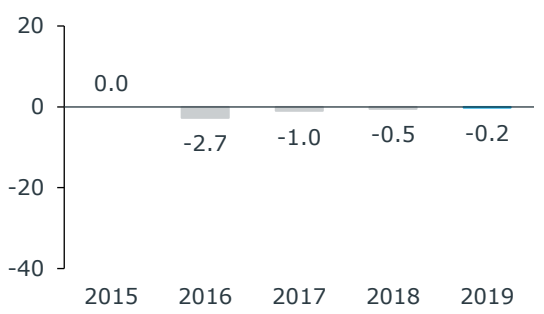
Bulgaria Retail Validation Study

2019 Validation Study

Validation Results

Precision	92.0%	Bias	-0.2%

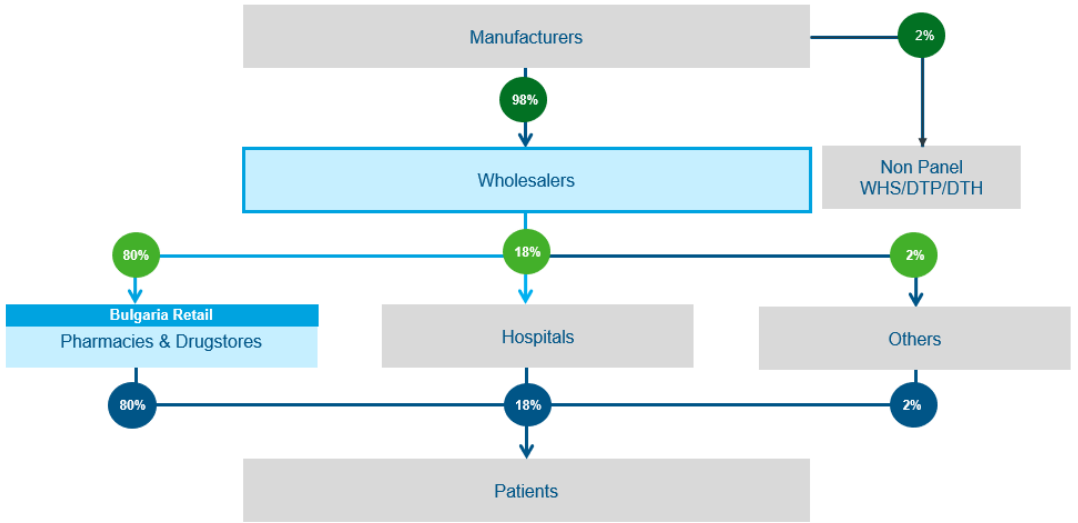




Outcomes

- Overall precision index declined by 3.0 percentage points in 2019;
- Overall underestimation improved by 0.3 percentage points in 2019;
- Working on including distributors for Food supplements and Cosmetics in particular.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
58 *(+40 vPY)*	**647** *(+339 vPY)*	**34%** *(+17% vPY)*

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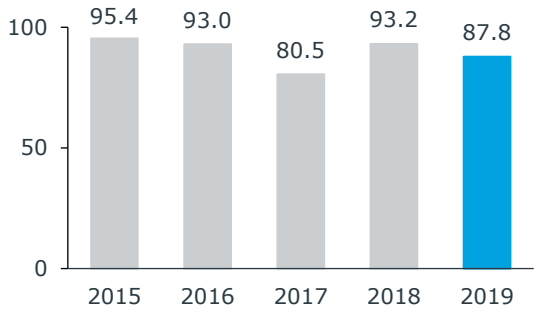
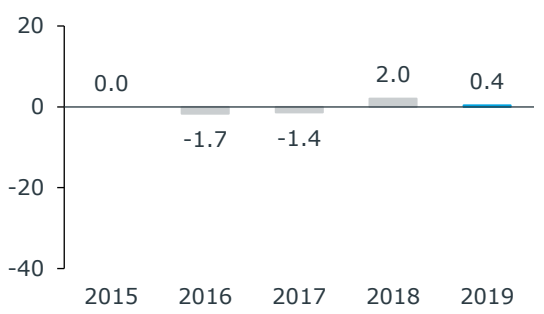
Bulgaria OTC Validation Study

2019 Validation Study

Validation Results

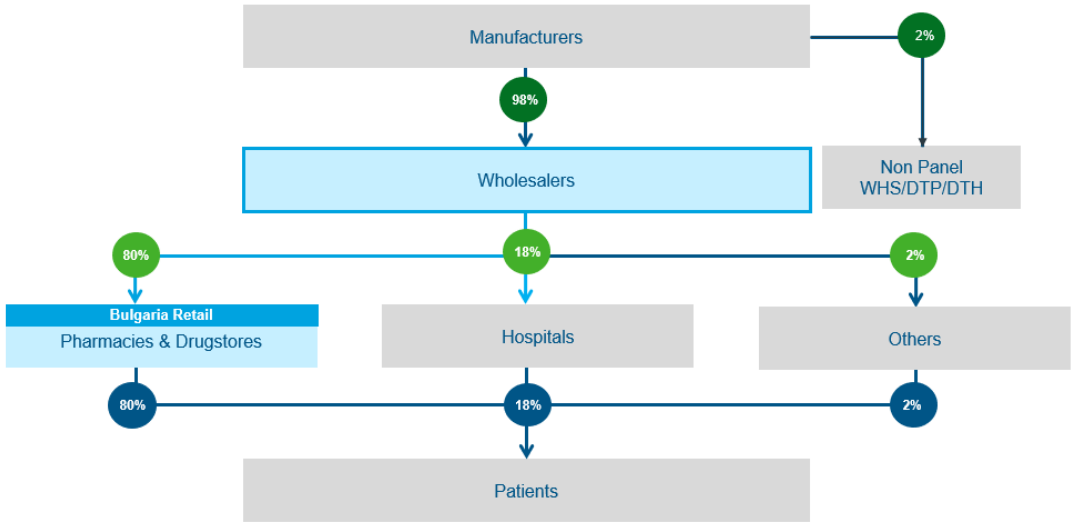
Precision	87.8%	Bias	0.4%





Outcomes	• Overall precision index declined by 5.4 percentage points in 2019 • Overall overestimation improved by 1.6 percentage points in 2019 • Working on including distributors for Food supplements and Cosmetics in particular

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
32 *(+24 vPY)*	**183** *(+124 vPY)*	**37%** *(+23% vPY)*

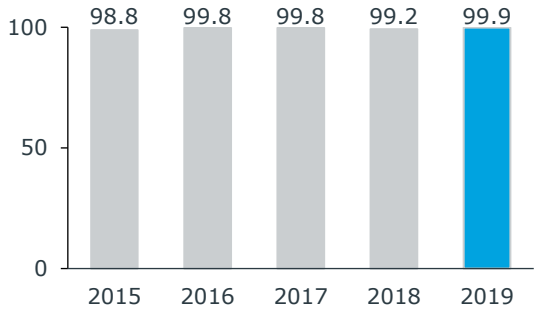
Back

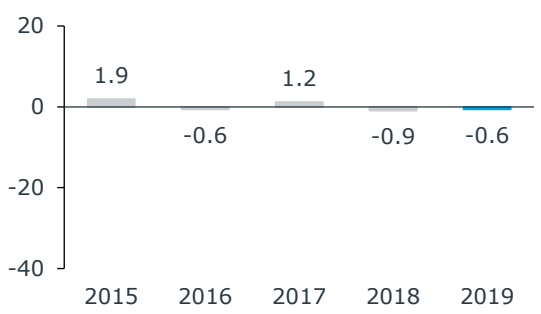
Croatia Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	99.9%	Bias	-0.6%

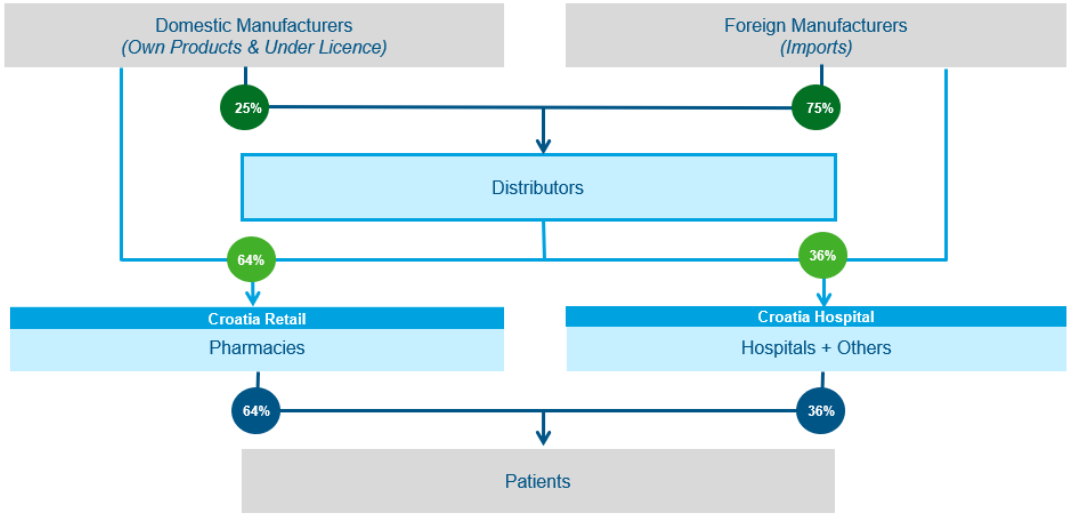




Outcomes

- Overall precision index improved by 0.7 percentage points in 2019;
- Overall underestimation improved by 0.3 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
9 *(no change vPY)*	**334** *(-76 vPY)*	**19%** *(-6% vPY)*

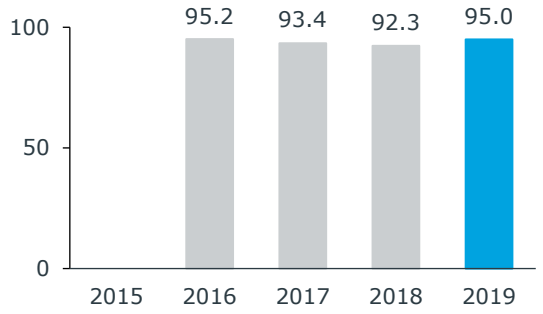
Back

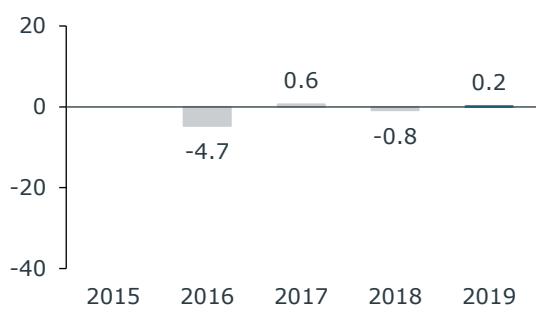
Croatia PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	95.0%	Bias	0.2%

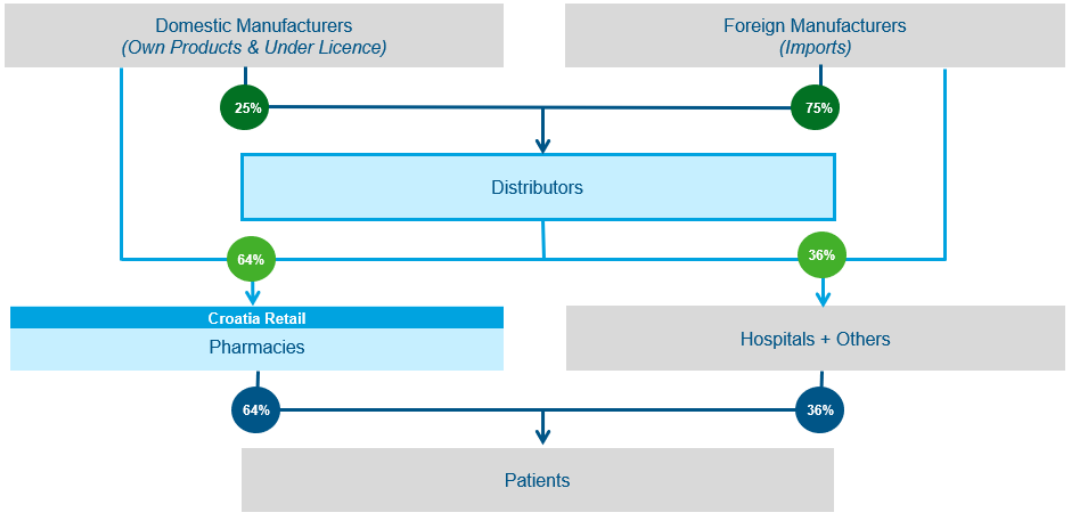




Outcomes

- Overall precision index improved by 2.7 percentage points in 2019
- Overall bias turned from 0.8% underestimation to 0.2% overestimation in 2019
- To Increase the collaboration in the validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
9 *(no change vPY)*	**248** *(-90 vPY)*	**12%** *(-5% vPY)*

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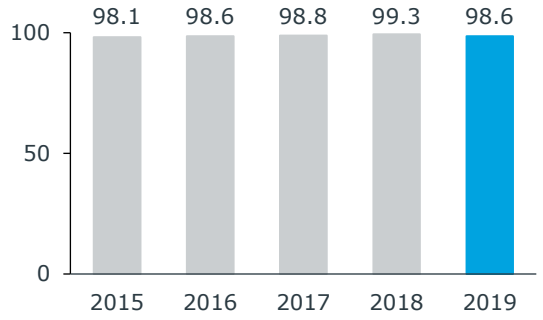
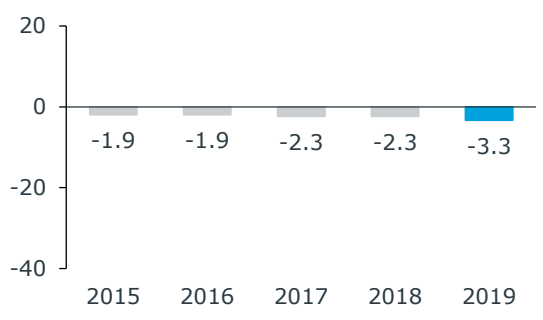
Czech Republic Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	98.6%	Bias	-3.3%

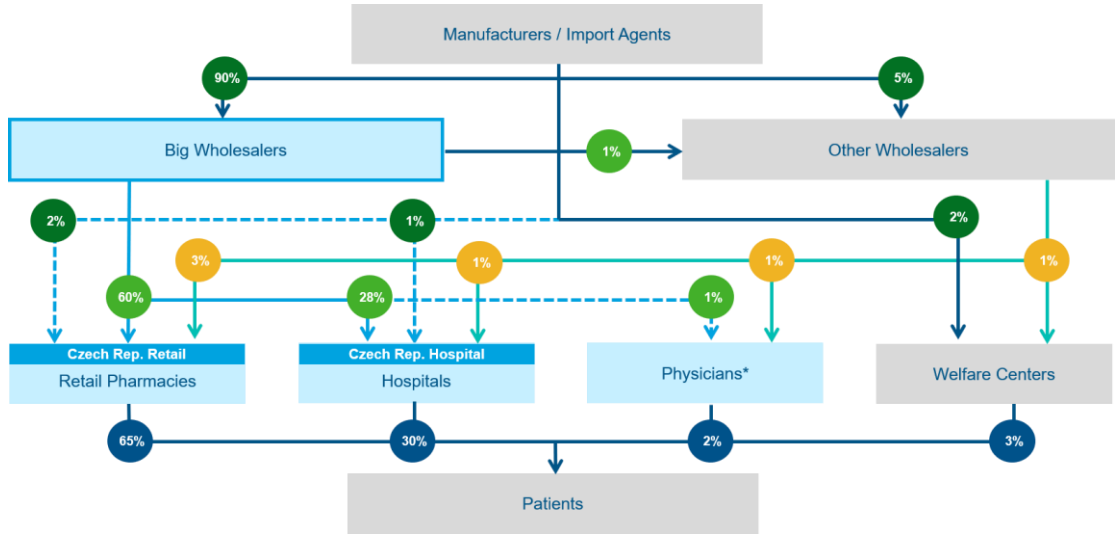




Outcomes

- Overall precision index declined slightly by 0.7 percentage points in 2019;
- Overall underestimation increased slightly by 1 percentage point in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
23 *(-2 vPY)*	**1,176** *(+57 vPY)*	**37%** *(no change vPY)*

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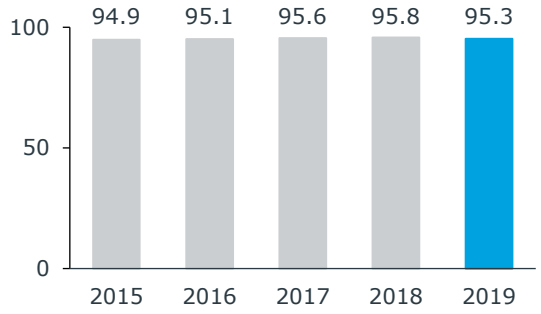
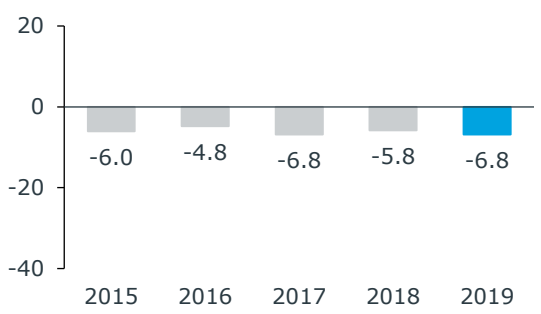
Czech Republic PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	95.3%	Bias	-6.8%

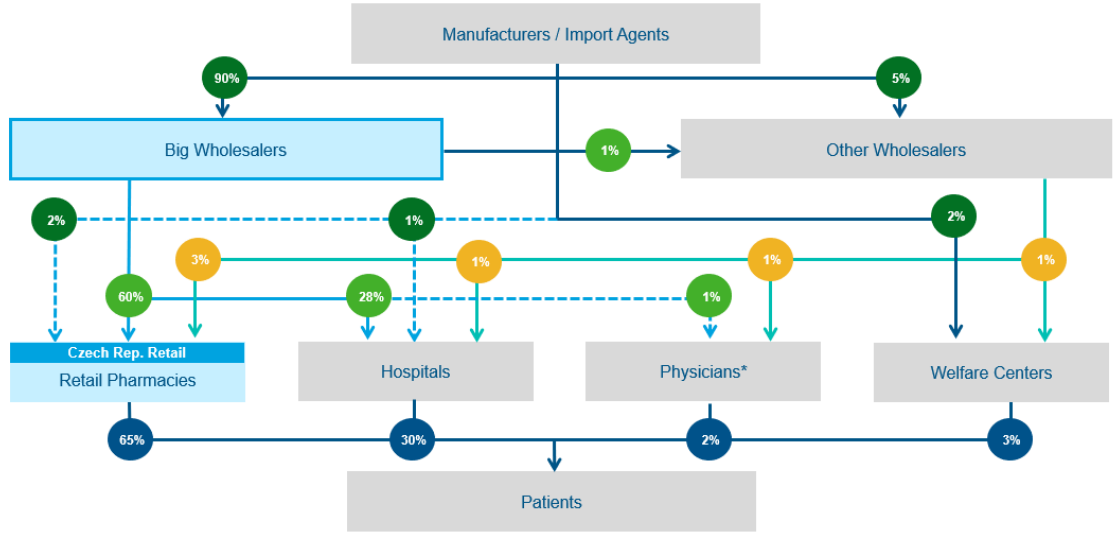




Outcomes

- Overall precision index decreased slightly by 0.5 percentage points in 2019
- Overall underestimation increased by 1.0 percentage point in 2019
- To explore ways improve projection methodology to further improve precision

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
22 *(-2 vPY)*	**750** *(-24 vPY)*	**23%** *(-2% vPY)*

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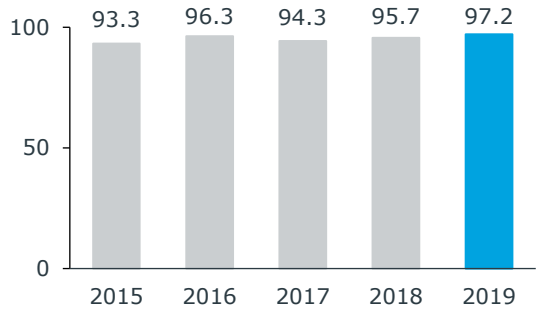
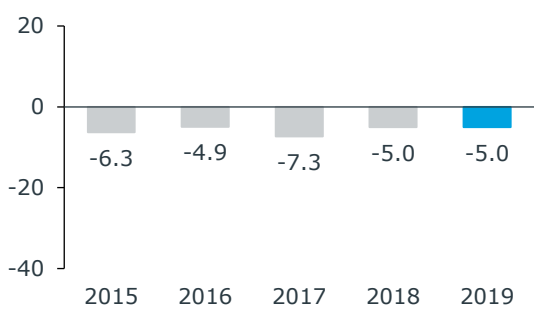
Czech Republic OTC Validation Study

2019 Validation Study

Validation Results

Precision	97.2%	Bias	-5.0%

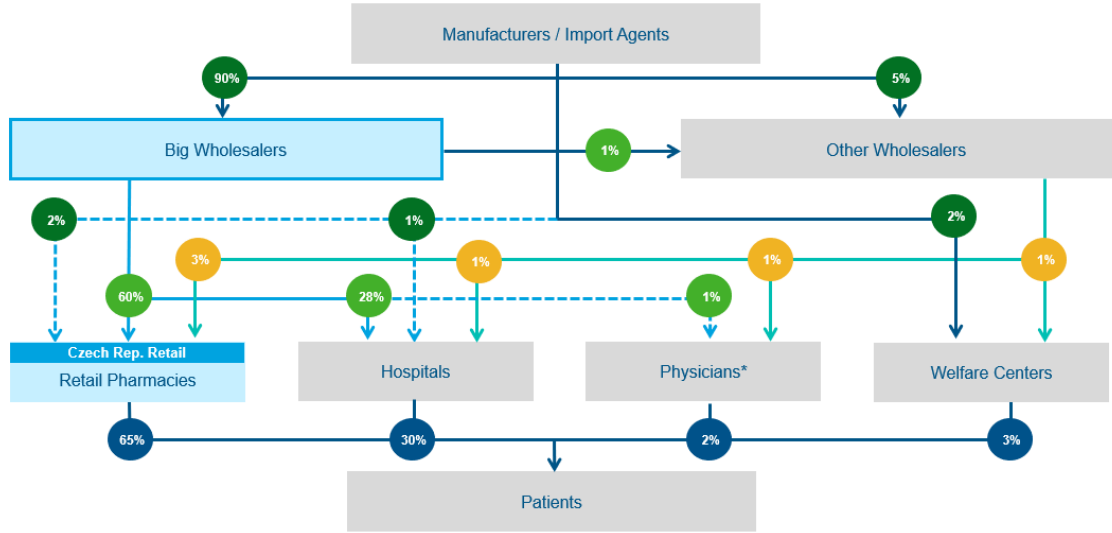




Outcomes

- Overall precision index improved by 1.5 percentage points in 2019
- Overall underestimation kept unchanged at 5.0% in 2019
- To explore ways improve projection methodology to further improve precision

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
11 *(-2 vPY)*	**158** *(-58 vPY)*	**23%** *(-7% vPY)*

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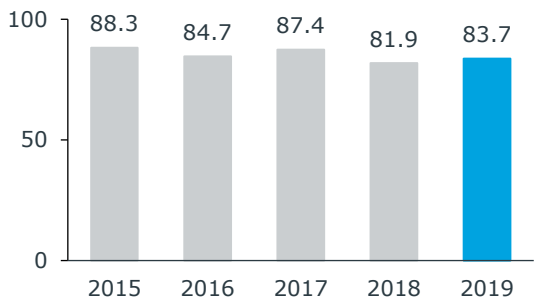
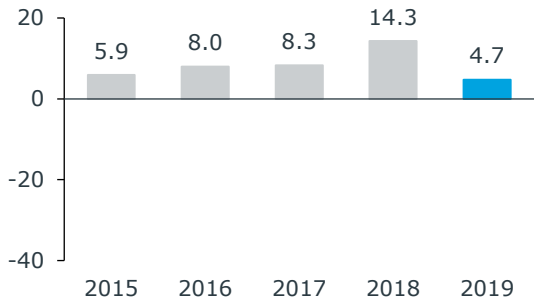
Estonia Retail Validation Study

2019 Validation Study

Validation Results

Precision	83.7%	Bias	4.7%

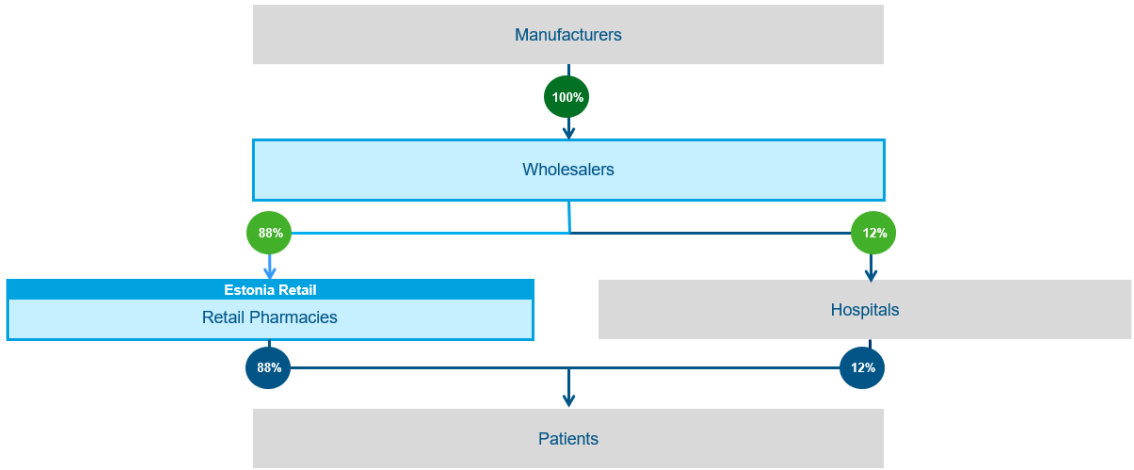




Outcomes

- Overall precision index improved by 1.8 percentage points in 2019;
- Overall overestimation improved by 9.6 percentage points in 2019;
- To review projection method to improve further.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
17 *(-4 vPY)*	**439** *(+39 vPY)*	**29%** *(+7% vPY)*

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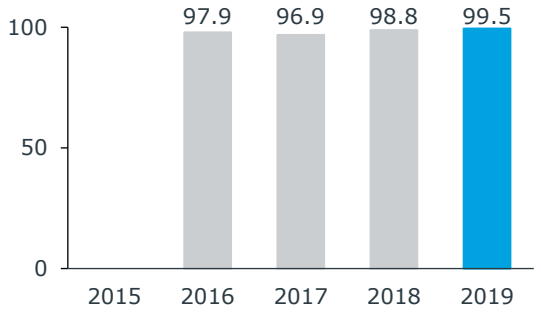
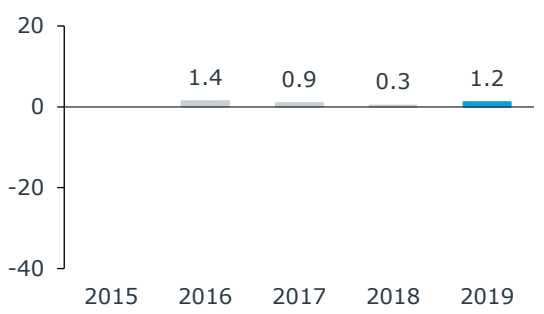
France Retail Validation Study

2019 Validation Study

Validation Results

Precision	99.5%	Bias	1.2%

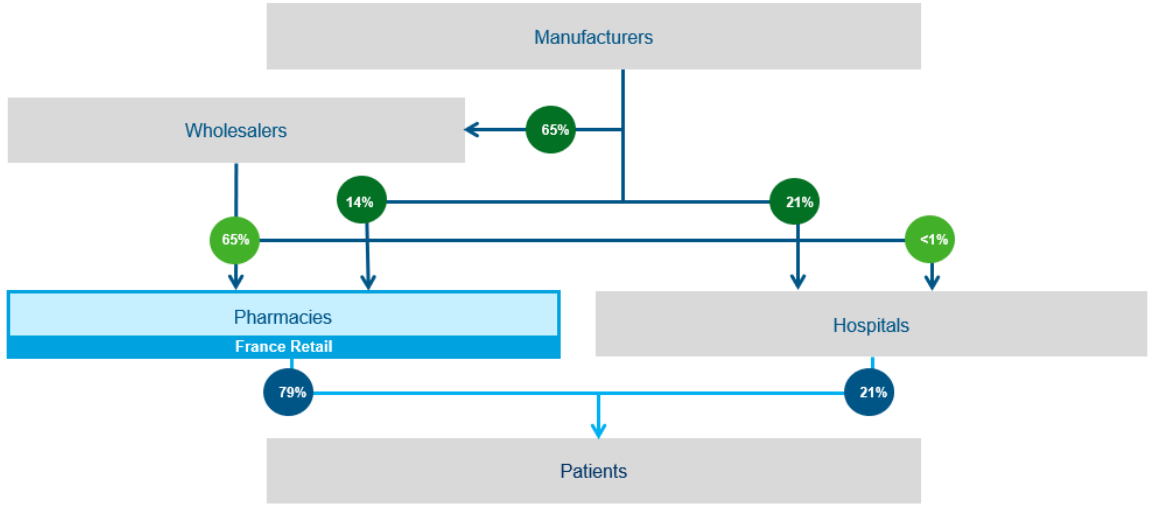




Outcomes

- Overall precision index improved by 0.7 percentage points in 2019;
- Overall overestimation increased by 0.9 percentage points in 2019;
- Review projection levels.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
159 *(+12 vPY)*	**3,515** *(+578 vPY)*	**89%** *(+1% vPY)*

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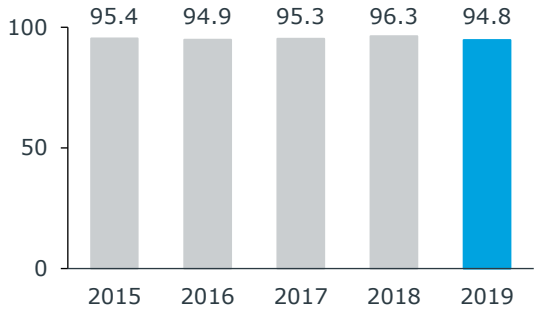
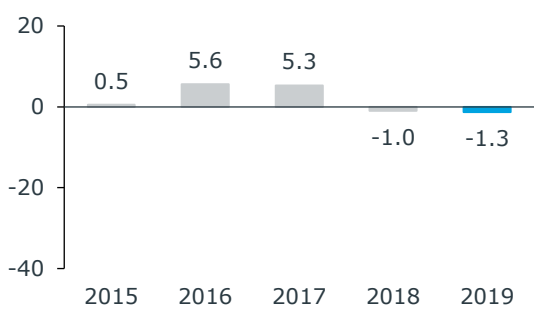
Finland PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	94.8%	Bias	-1.3%

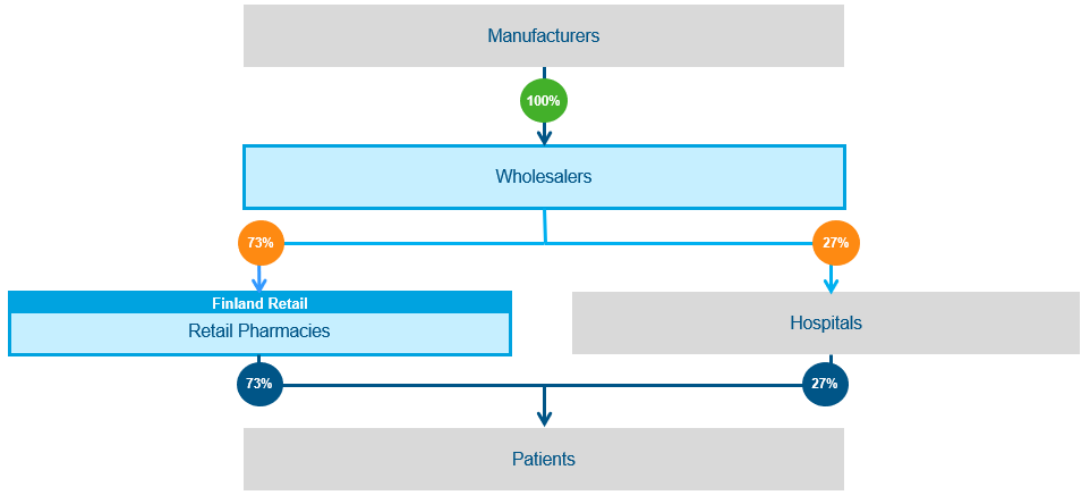




Outcomes

- Overall precision index declined by 1.5 percentage points in 2019
- Overall underestimation increased slightly by 0.3 percentage points in 2019
- To investigate CDS implementation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
134 *(+2 vPY)*	**1,639** *(-155 vPY)*	**56%** *(-1% vPY)*

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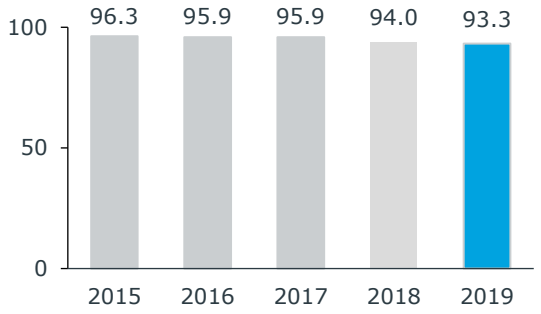
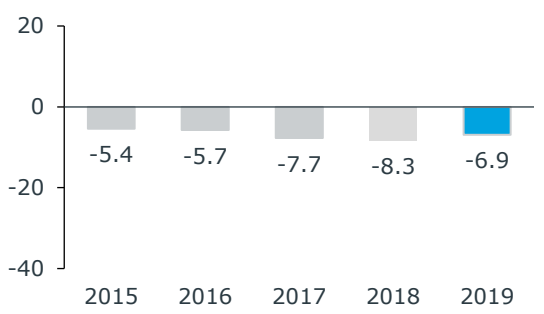
Germany Retail Validation Study

2019 Validation Study (Sell-in Data)

Validation Results

Precision	93.3%	Bias	-6.9%

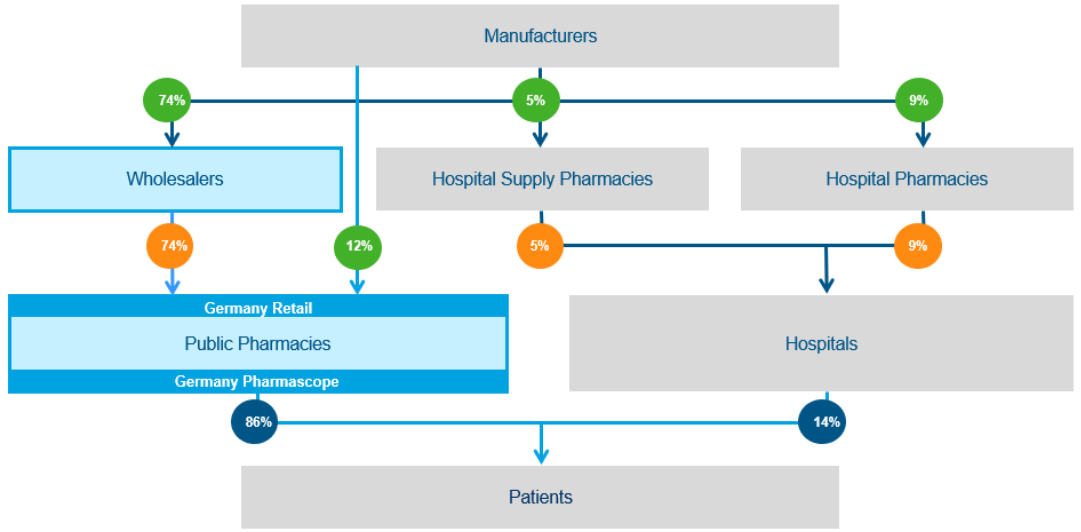




Outcomes

- Result are based on German Hospital Counting Units (ZE) as opposed to units published previously
- Overall precision index declined by 0.7 percentage points in 2019
- Overall underestimation improved by 1.4 percentage points in 2019
- Win more clients to increase data basis for validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
26 *(+2 vPY)*	**1,590** *(-130 vPY)*	**11%** *(no change vPY)*

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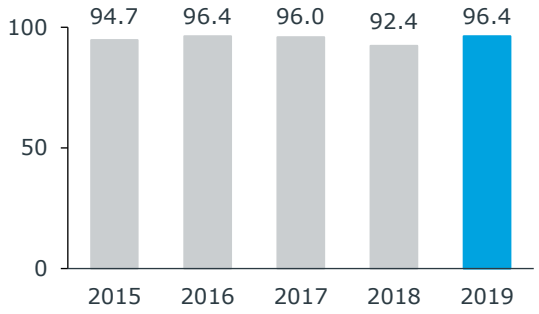
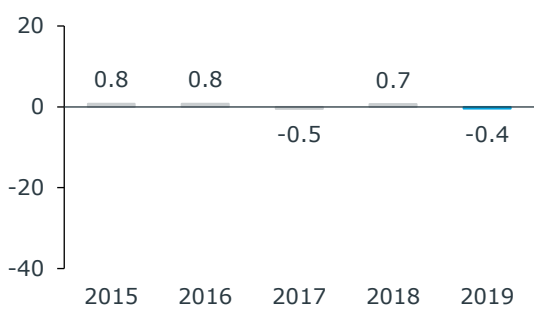
Germany PharmaScope Validation Study

2019 Validation Study (Sell-out Data)

Validation Results

Precision	96.4%	Bias	-0.4%

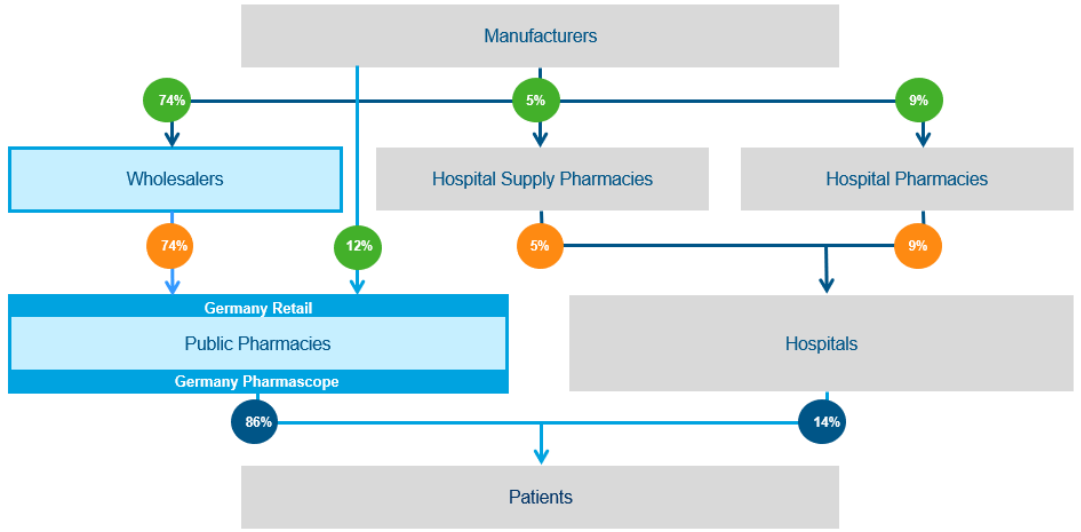




Outcomes

- Result are based on German Hospital Counting Units (ZE) as opposed to units published previously
- Overall precision index improved by 4.0 percentage points in 2019.
- Overall bias changed from 0.7% overestimation in 2018 to 0.4% underestimation in 2019

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
26 *(+2 vPY)*	**1,592** *(-208 vPY)*	**11%** *(no change vPY)*

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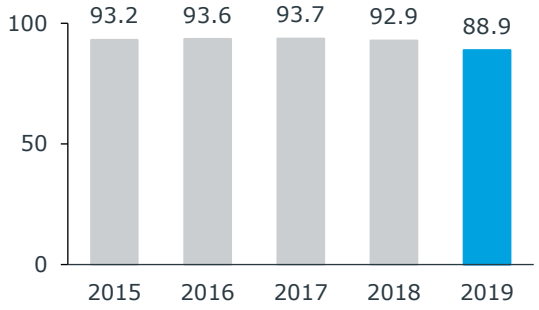
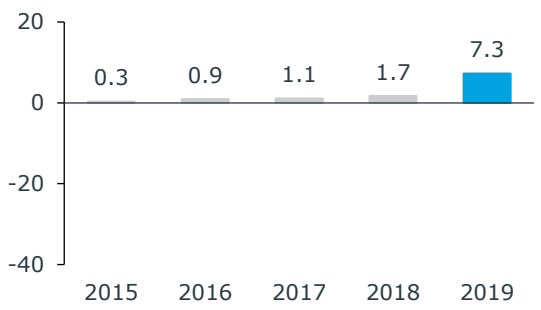
Germany PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	88.9%	Bias	7.3%

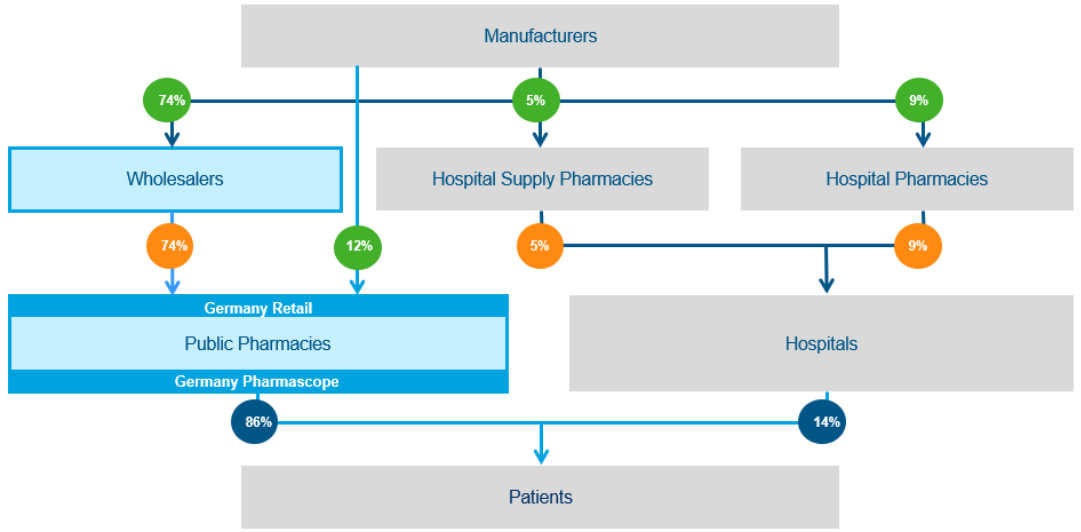




Outcomes

- Overall precision index declined by 4.0 percentage points in 2019. Overall overestimation increased by 5.6 percentage points in 2019
- Analyses confirmed the increased Bias originates partially from increased stock/inventory consumption.
- Review of data collection and QC methodologies ongoing.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
34 *(+3 vPY)*	**2,054** *(-38 vPY)*	**15%** *(+2% vPY)*

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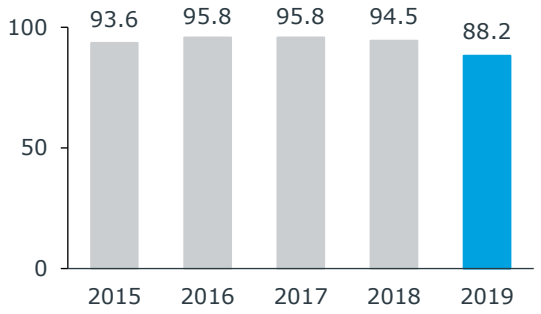
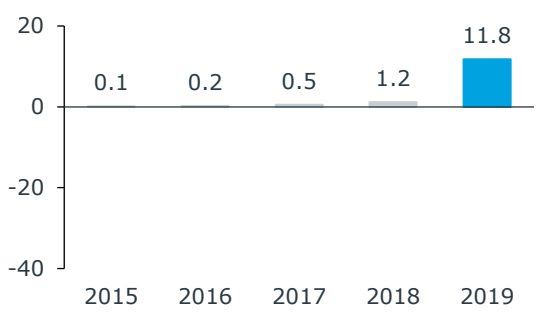
Germany OTC Validation Study

2019 Validation Study

Validation Results

Precision	88.2%	Bias	11.8%

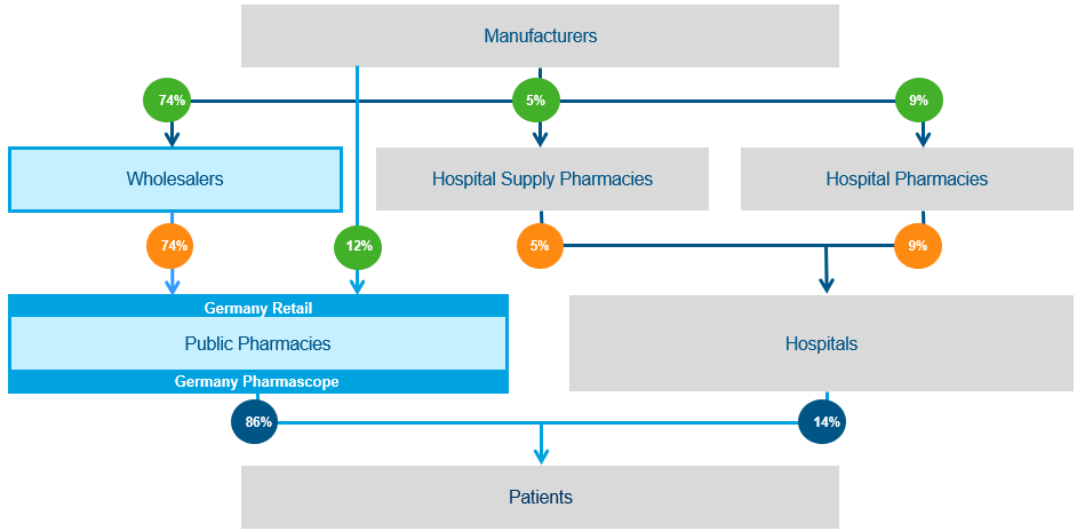




Outcomes

- Overall precision index declined by 6.3 percentage points in 2019. Overall overestimation increased by 10.6 percentage points in 2019
- Analyses confirmed the increased Bias originates partially from increased stock/inventory consumption.
- Review of data collection and QC methodologies ongoing.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
13 *(-2 vPY)*	**414** *(+87 vPY)*	**8%** *(+2% vPY)*

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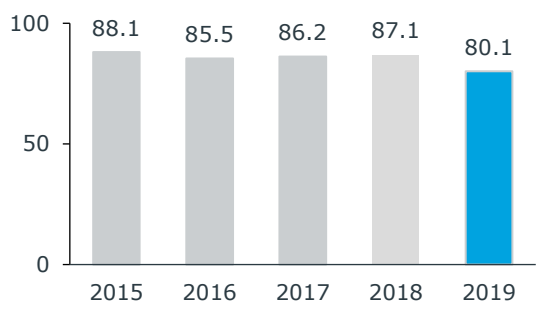
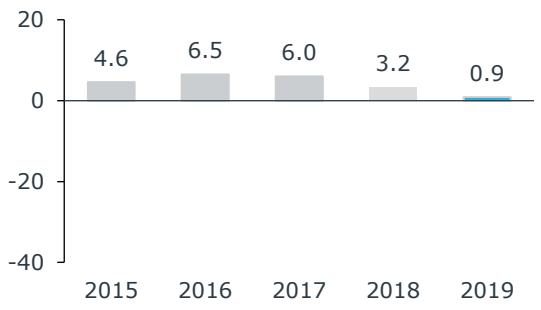
Germany Hospital Validation Study

2019 Validation Study (Consumption Data)

Validation Results

Precision	80.1%	Bias	0.9%

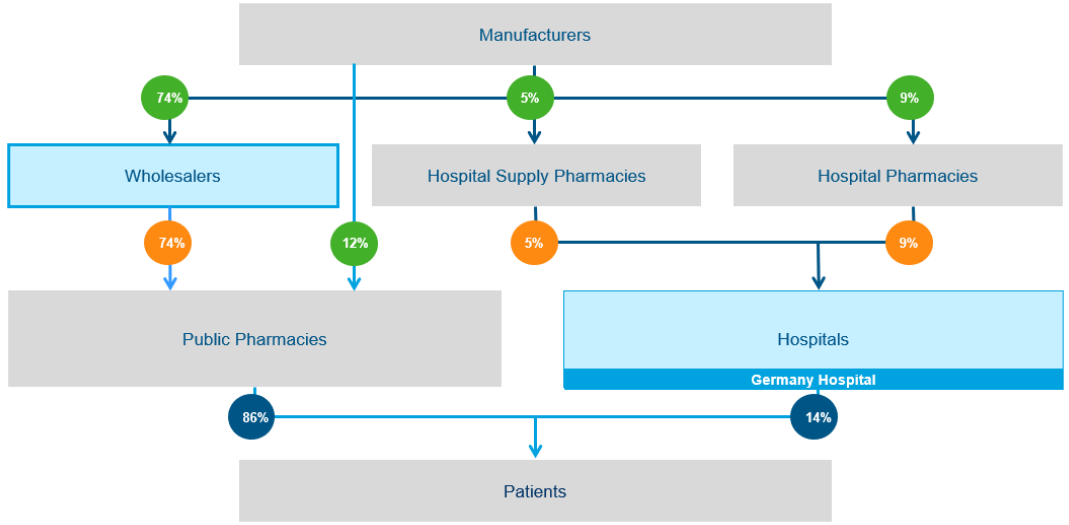




Outcomes

- Result are based on German Hospital Counting Units (ZE) as opposed to units
- Overall precision index declined by 7.0 percentage points in 2019
- Overall overestimation improved by 2.3 percentage points in 2019 due to changed projection methodology
- Win more clients to increase data basis for validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
22 *(-1 vPY)*	**947** *(-96 vPY)*	**8%** *(-1% vPY)*

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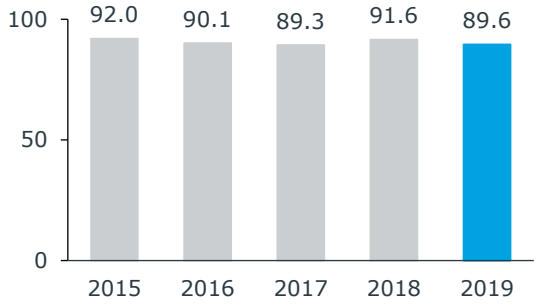
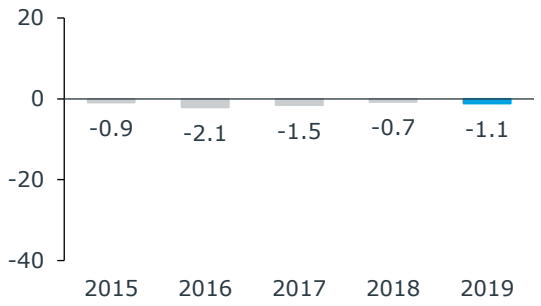
Greece Retail Validation Study

2019 Validation Study

Validation Results

Precision	89.6%	Bias	-1.1%

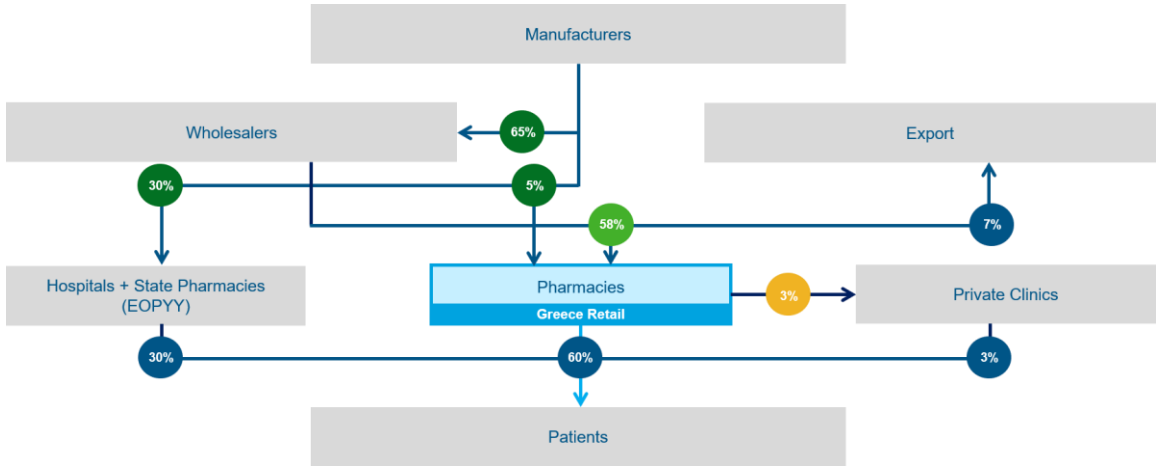




Outcomes

- Overall precision index declined by 2 percentage points in 2019;
- Overall underestimation slightly increased by 0.4 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
64 *(+19 vPY)*	**962** *(+20 vPY)*	**52%** *(-2 vPY)*

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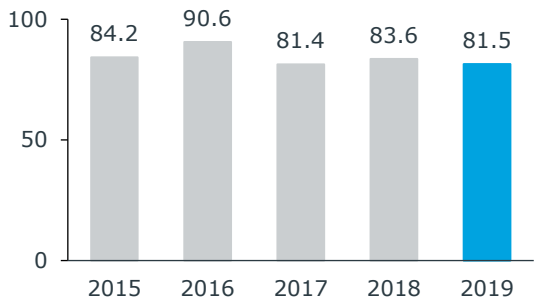
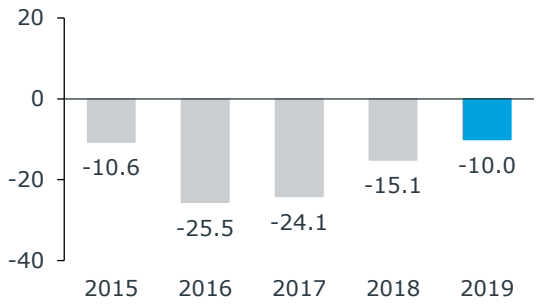
Greece OTC Validation Study

2019 Validation Study

Validation Results

Precision	81.5%	Bias	-10.0%

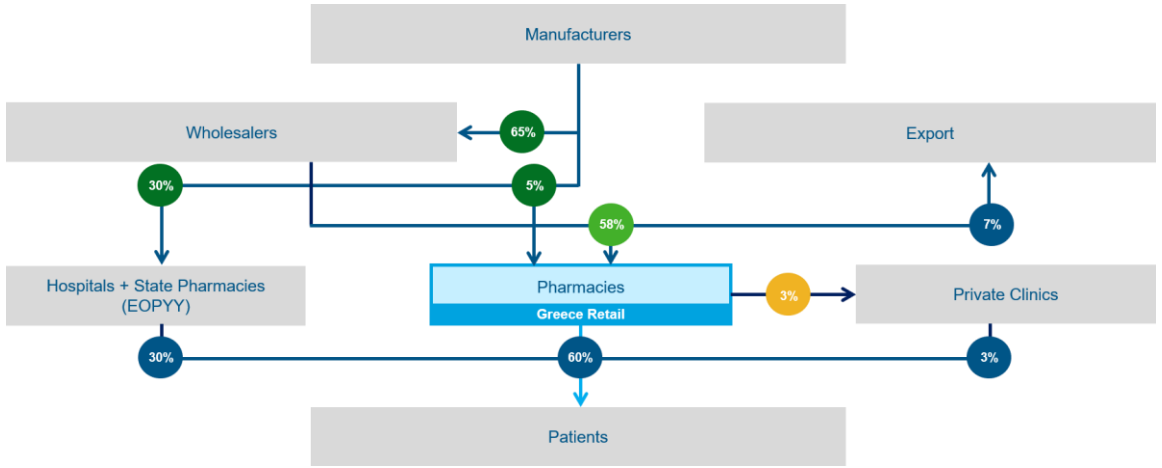




Outcomes

- Overall precision index declined by 2.1 percentage points in 2019;
- Overall underestimation improved by 5.1 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
15 *(-3 vPY)*	**84** *(+11 vPY)*	**36%** *(+20% vPY)*

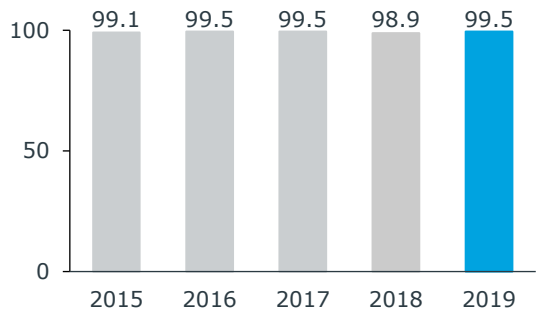
Back

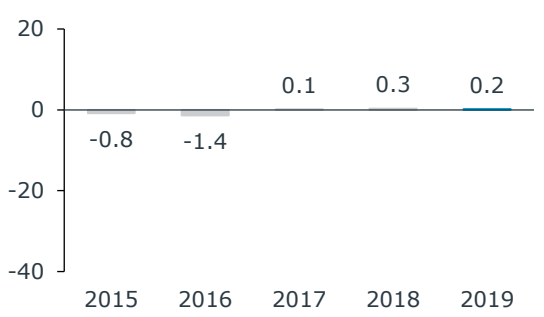
Hungary Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	99.5%	Bias	0.2%

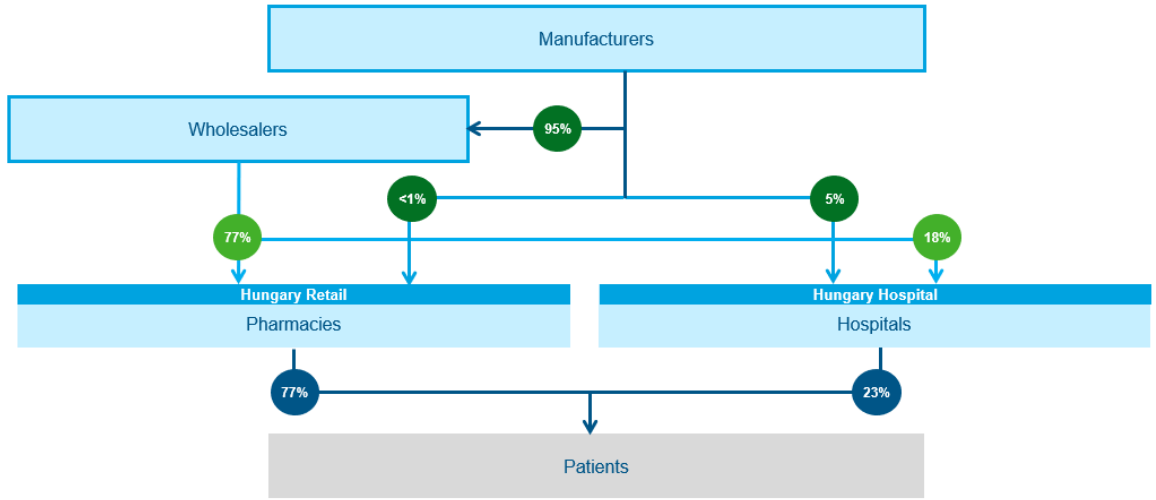




Outcomes

- Overall precision index improved by 0.6 percentage points in 2019;
- Overall overestimation improved by 0.1 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
70 *(+3 vPY)*	**1,541** *(-18 vPY)*	**68%** *(-4% vPY)*

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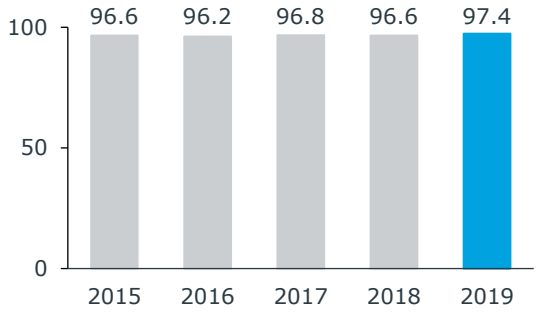
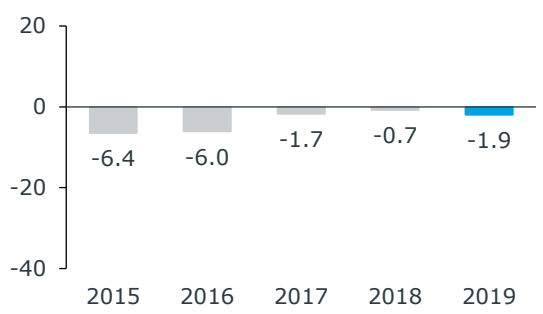
Hungary PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	97.4%	Bias	-1.9%

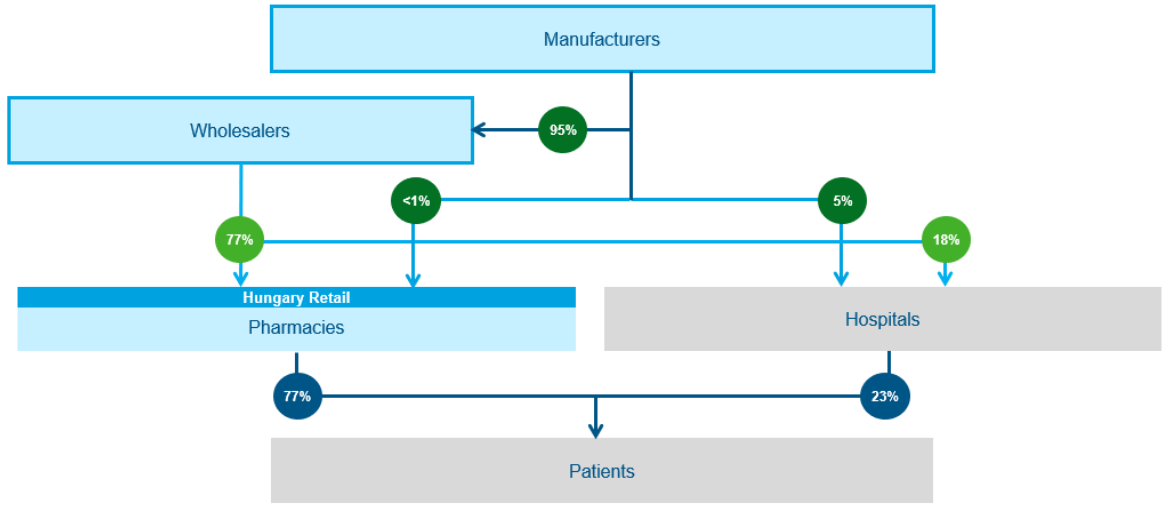




Outcomes

- Overall precision index improved by 0.8 percentage points in 2019
- Overall underestimation increased by 1.2 percentage points in 2019
- No action required from the statistical point of view

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
69 *(+5 vPY)*	**1,294** *(-58 vPY)*	**55%** *(-4% vPY)*

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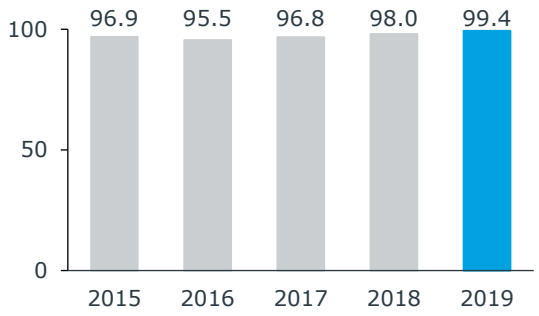
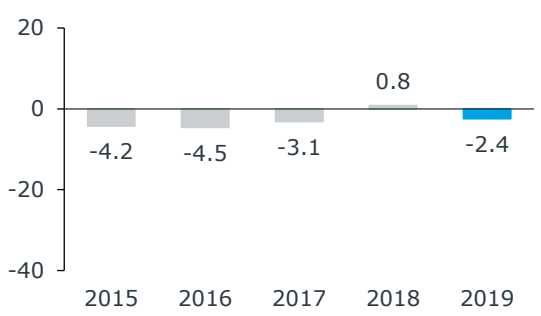
Hungary OTC Validation Study

2019 Validation Study

Validation Results

Precision	99.4%	Bias	-2.4%

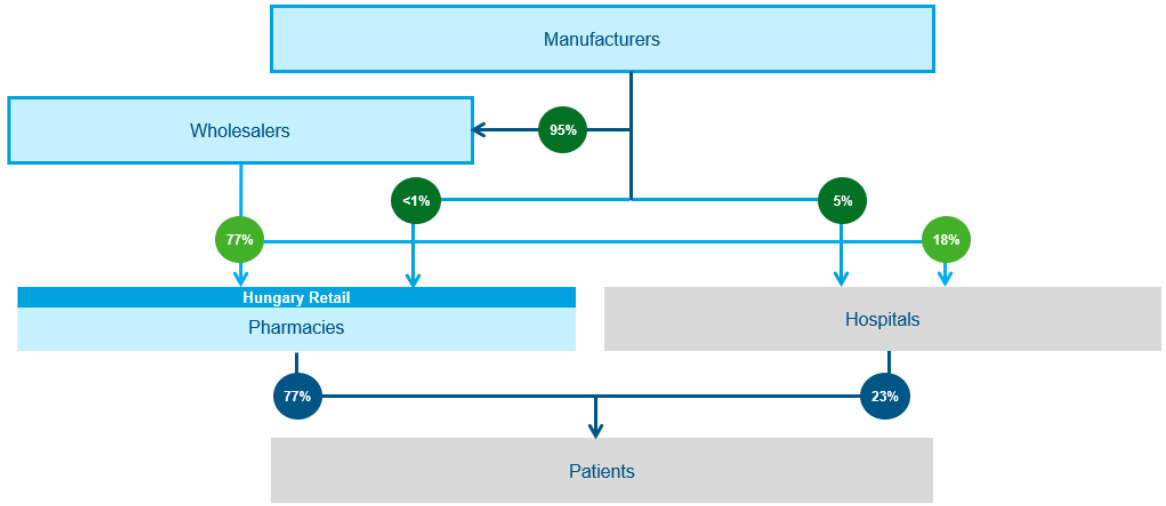




Outcomes

- Overall precision index improved by 1.4 percentage point in 2019
- Overall bias turned from 0.8% overestimation in 2018 to 2.4% underestimation in 2019
- No action required from the statistical point of view

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
42 *(+3 vPY)*	**340** *(-4 vPY)*	**49%** *(-4% vPY)*

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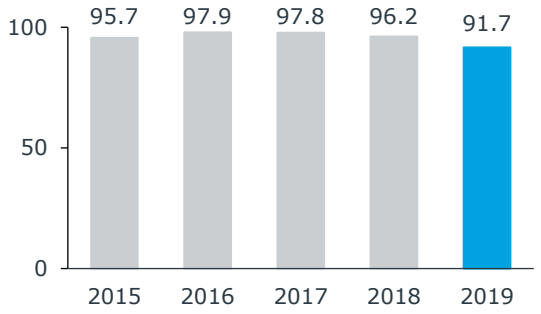
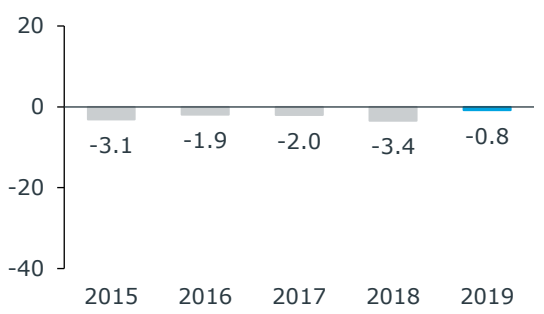
Italy Retail Validation Study

2019 Validation Study

Validation Results

Precision	91.7%	Bias	-0.8%

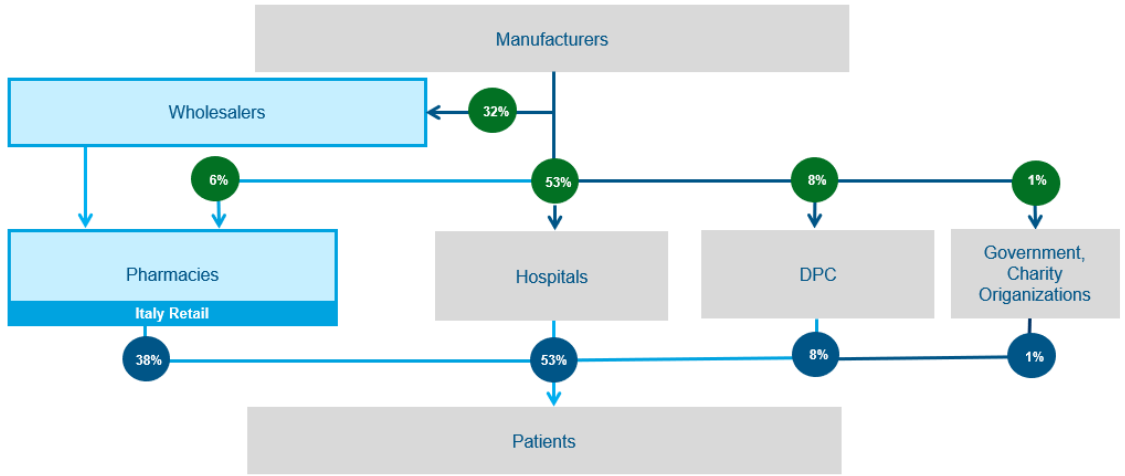




Outcomes

- Overall precision index declined by 4.5 percentage points in 2019;
- Overall underestimation improved by 2.6 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
37 *(+2 vPY)*	**1,636** *(+140 vPY)*	**36%** *(+2% vPY)*

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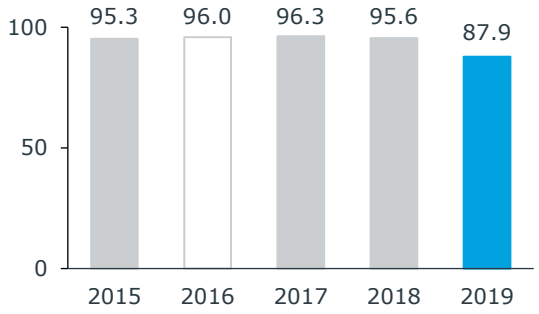
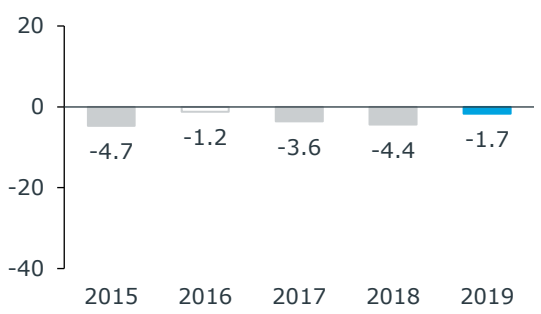
Italy PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	87.9%	Bias	-1.7%

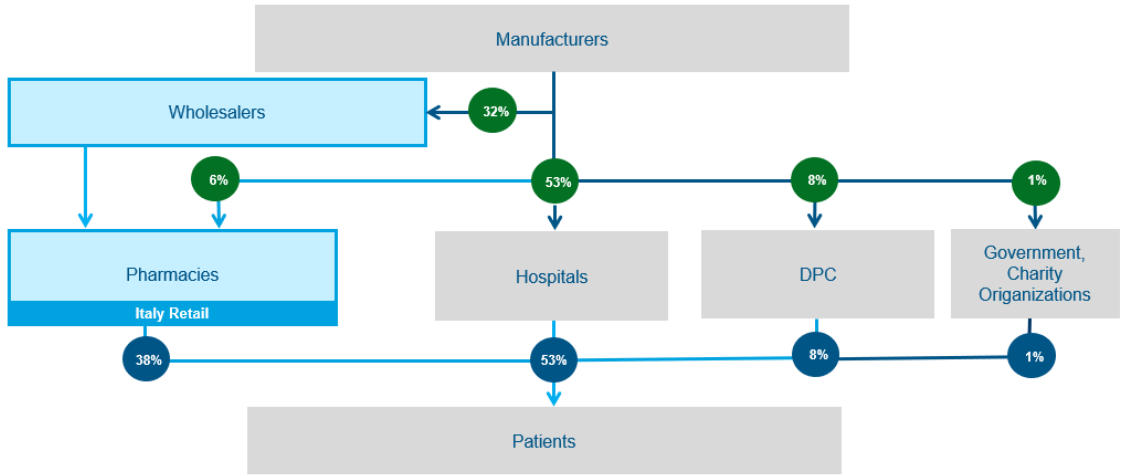




Outcomes

- Overall precision index decreased by 7.7 percentage points in 2019
- Overall underestimation improved by 2.7 percentage points in 2019
- *No action required from the statistical point of view.*

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
36 *(+2 vPY)*	**1,574** *(+131 vPY)*	**32%** *(+2% vPY)*

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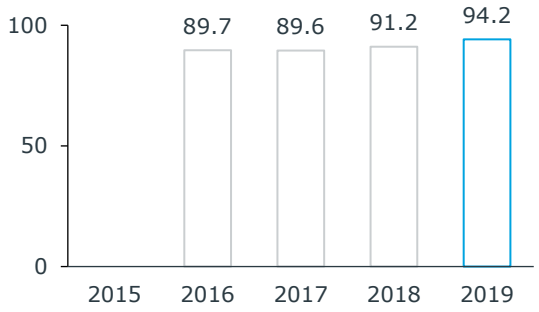
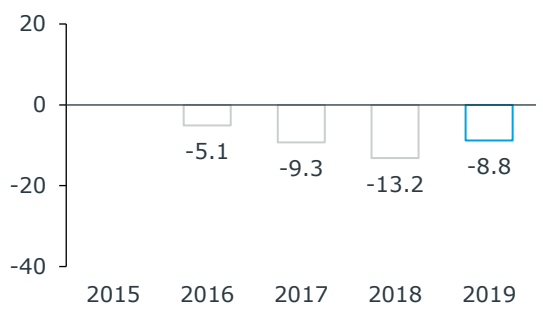
Italy OTC Validation Study

2019 Validation Study

Validation Results

Precision	94.2%	Bias	-8.8%

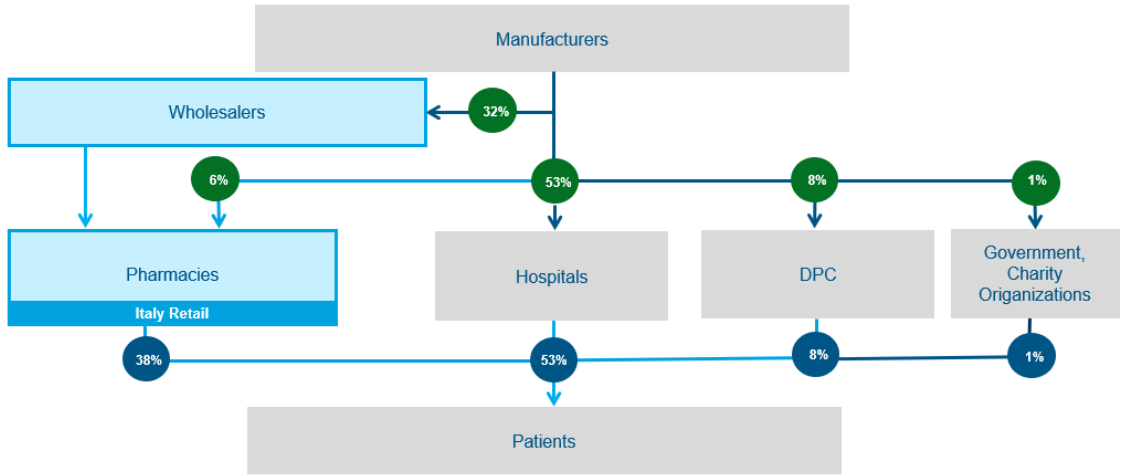




Outcomes

- Overall precision index improved by 3.0 percentage points in 2019
- Overall underestimation improved by 4.4 percentage points in 2019
- *No action required from the statistical point of view.*

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
19 *(-1 vPY)*	**95** *(+3 vPY)*	**5%** *(no change vPY)*

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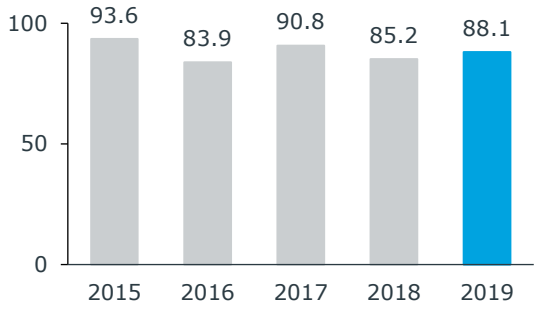
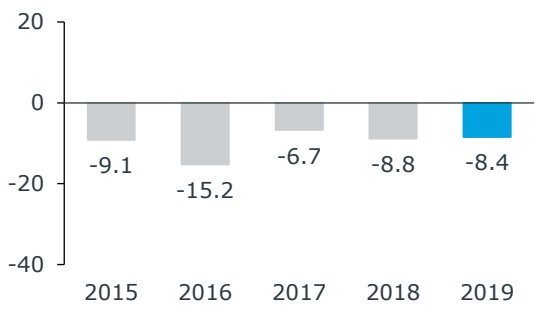
Italy Hospital Validation Study

2019 Validation Study

Validation Results

Precision	88.1%	Bias	-8.4%

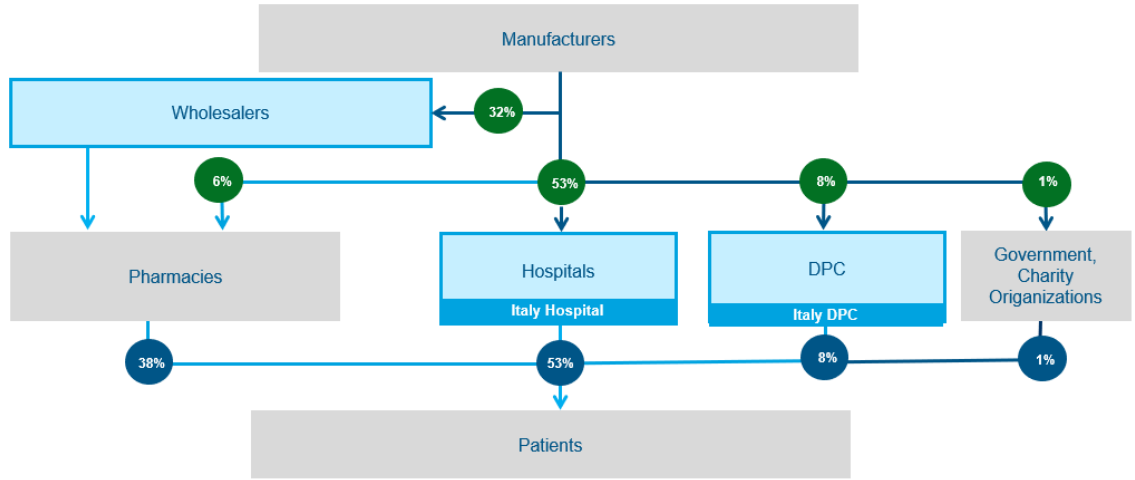




Outcomes

- Overall precision index improved by 2.9 percentage points in 2019;
- Overall underestimation improved by 0.4 percentage points in 2019;
- Continue implementation of quality-improving actions.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
20 *(+3 vPY)*	**359** *(+43 vPY)*	**29%** *(+3% vPY)*

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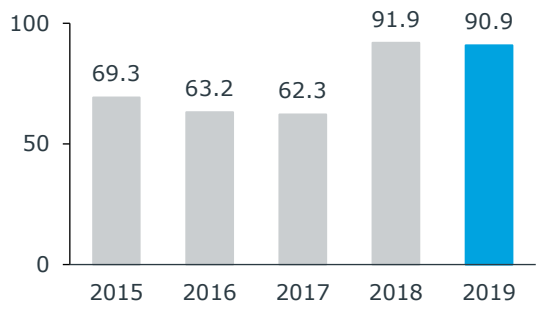
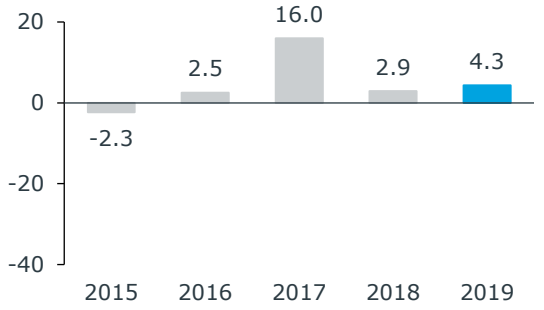
Kazakhstan Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	90.9%	Bias	4.3%

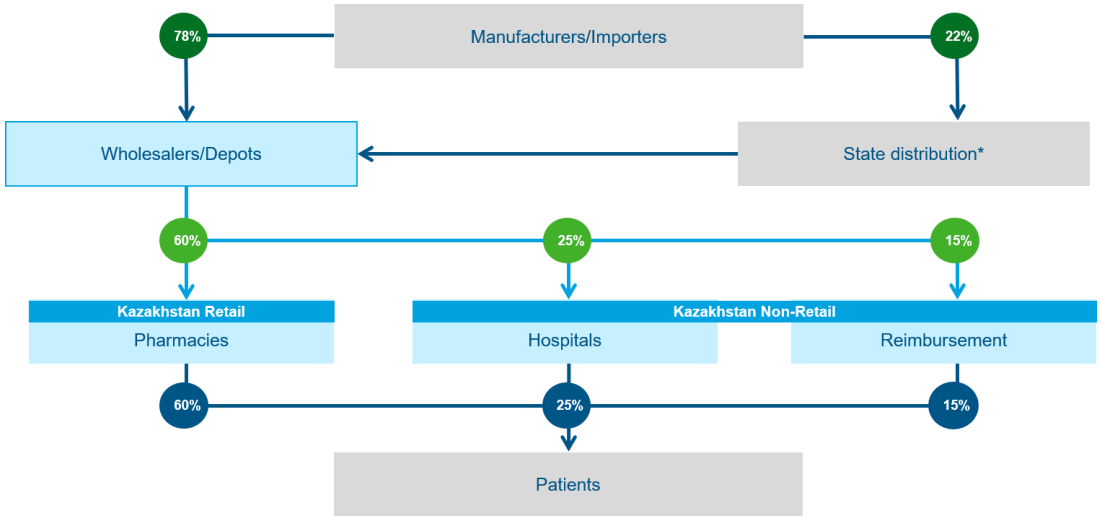




Outcomes

- Overall precision index declined by 1 percentage point in 2019;
- Overall overestimation increase d by 1.4 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
42 *(-1 vPY)*	**459** *(-10 vPY)*	**10%** *(-8% vPY)*

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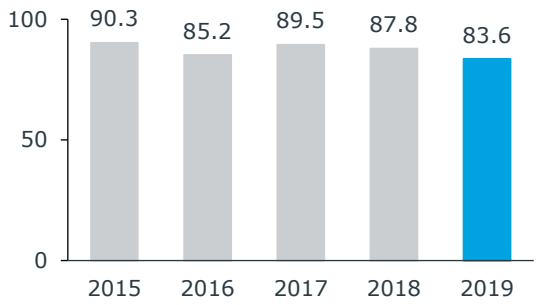
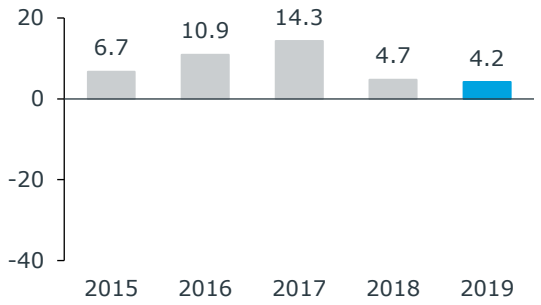
Latvia Retail Validation Study

2019 Validation Study

Validation Results

Precision	83.6%	Bias	4.2%

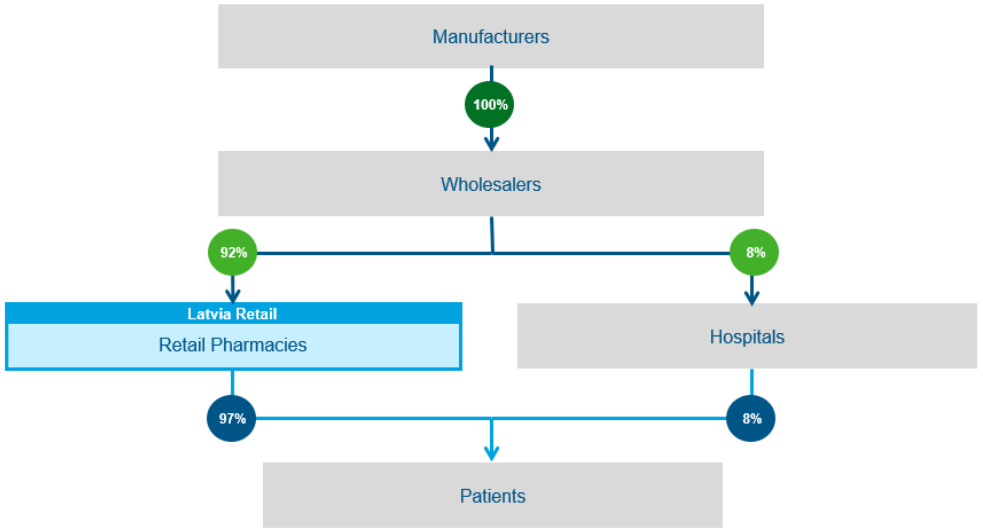




Outcomes

- Overall precision index declined by 4.2 percentage points in 2019;
- Overall overestimation improved by 0.5 percentage points in 2019;
- To further increase panel size and review projection methodology.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
22 *(-1 vPY)*	**600** *(+215 vPY)*	**28%** *(+9% vPY)*

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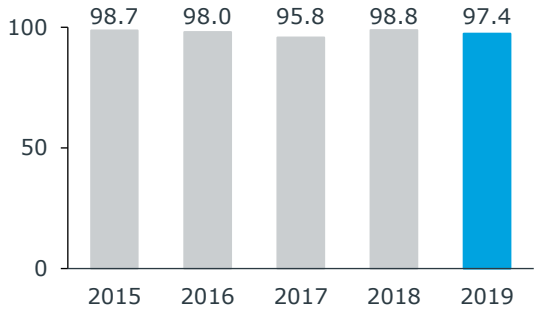
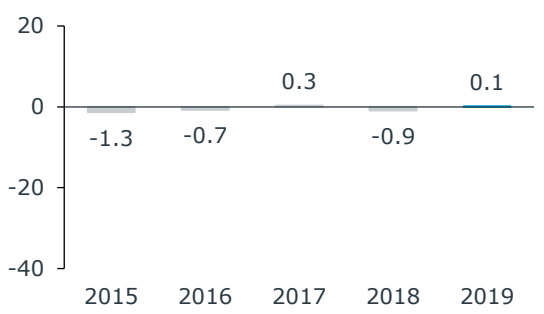
Lithuania Retail Validation Study

2019 Validation Study

Validation Results

Precision	97.4%	Bias	0.1%

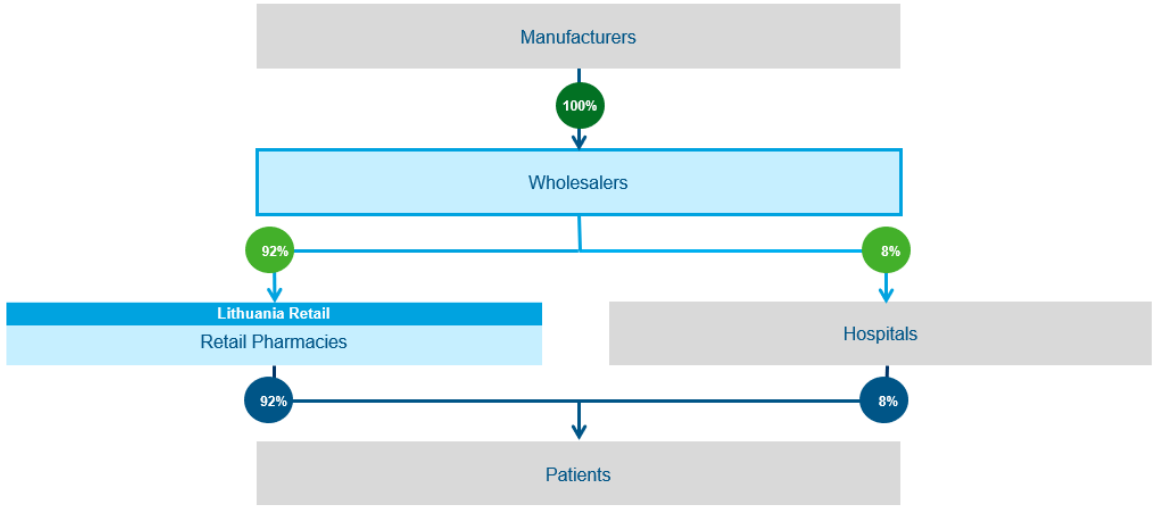




Outcomes

- Overall precision index declined by 1.4 percentage points in 2019;
- Overall bias turned from 0.9% underestimation in 2018 to 0.1% overestimation in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
21 *(-3 vPY)*	**596** *(+113 vPY)*	**30%** *(+8% vPY)*

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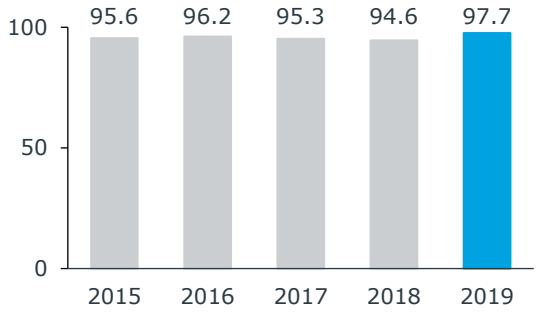
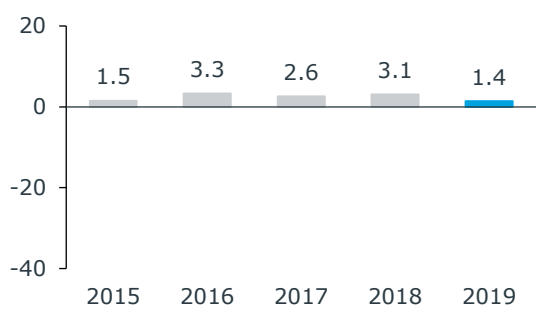
Poland Retail+Hospital Validation Study

2019 Validation Study

Validation Results

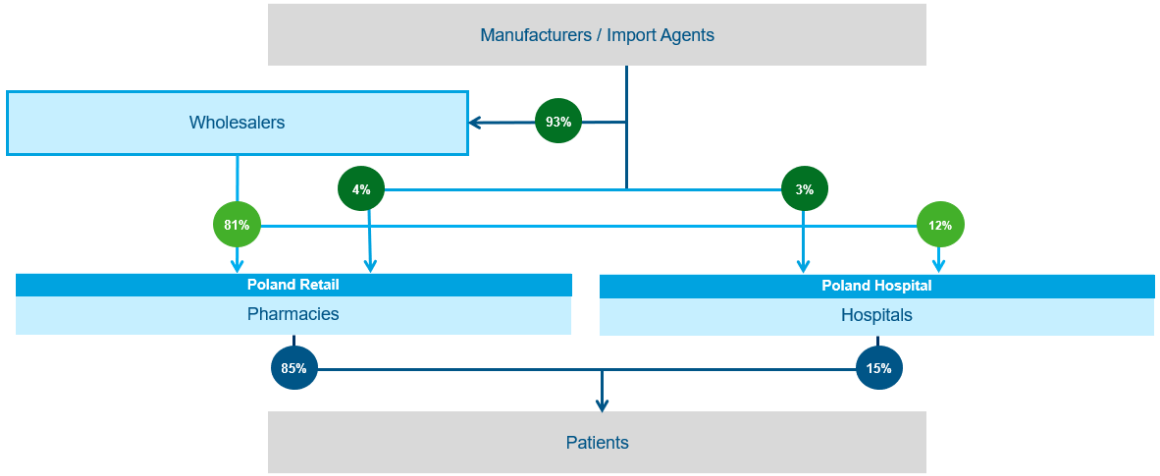
Precision	97.7%	Bias	1.4%





Outcomes	• Overall precision index improved by 3.1 percentage points in 2019; • Overall overestimation improved by 1.7 percentage points in 2019; • Annual revision of projection factors.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
34 *(-28 vPY)*	**715** *(-355 vPY)*	**14%** *(-7% vPY)*

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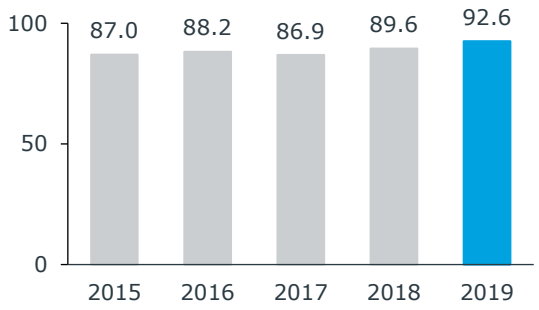
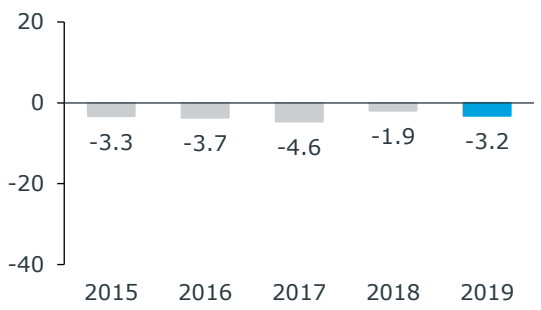
Poland PharmaTrend Validation Study

2019 Validation Study

Validation Results

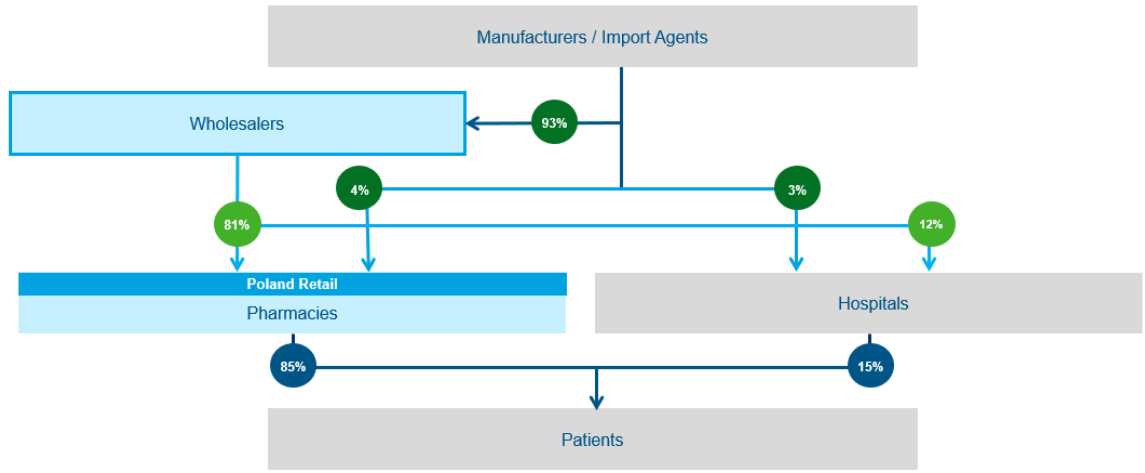
Precision	92.6%	Bias	-3.2%





Outcomes	• Overall precision index improved by 3.0 percentage points in 2019 • Overall underestimation increased by 1.3 percentage points in 2019 • To explore ways improve projection methodology to further improve precision & Increase the collaboration in the validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
33 *(-27 vPY)*	**615** *(-317 vPY)*	**9%** *(-4% vPY)*

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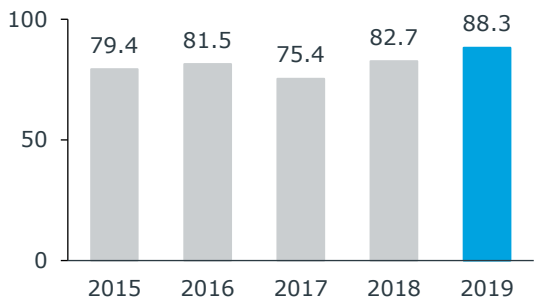
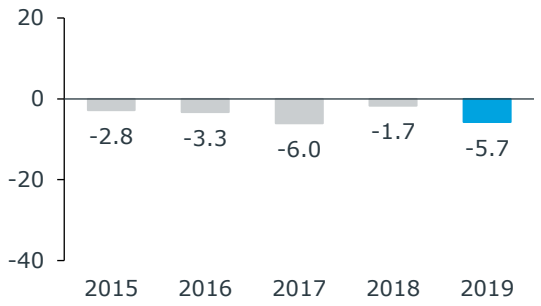
Poland OTC Validation Study

2019 Validation Study

Validation Results

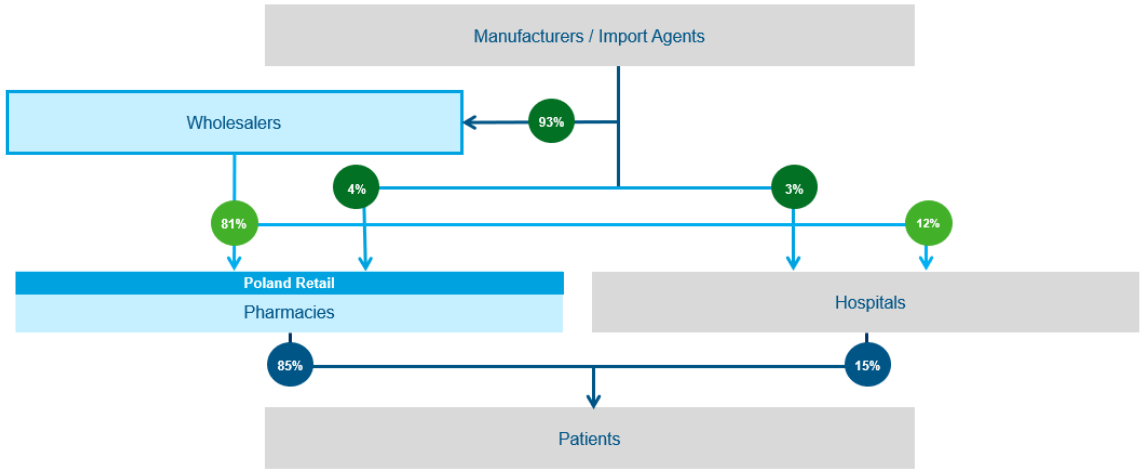
Precision	88.3%	Bias	-5.7%





Outcomes	• Overall precision index improved by 5.6 percentage points in 2019 • Overall underestimation increased by 4.0 percentage points in 2019 • To explore ways improve projection methodology to further improve precision & Increase the collaboration in the validation

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
19 *(15 vPY)*	**196** *(-71 vPY)*	**13%** *(-4% vPY)*

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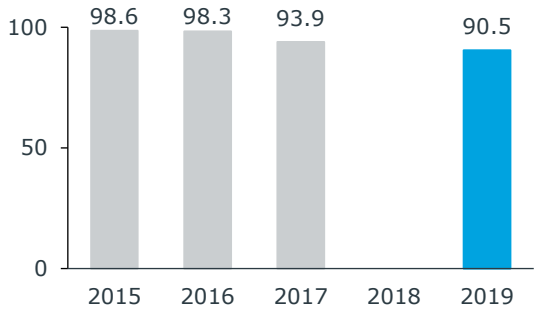
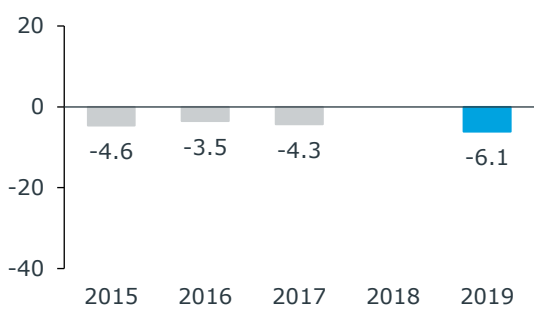
Portugal Retail Validation Study

2019 Validation Study

Validation Results

Precision	90.5%	Bias	-6.1%

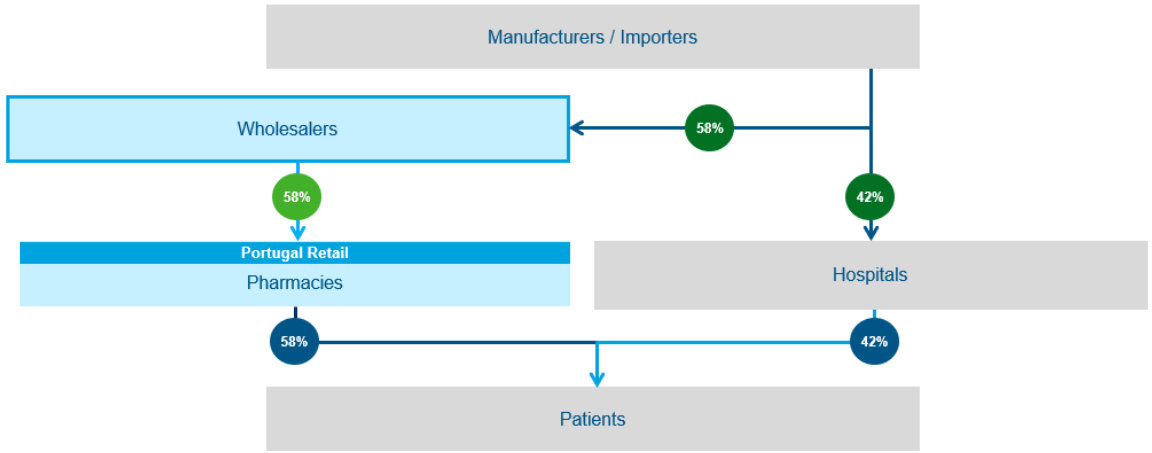




Outcomes

- Overall precision index declined by 3.4 percentage points in 2019;
- Overall underestimation increased by 1.8 percentage points in 2019;
- To review projection levels and increase manufacturer participation on the validation.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(+4 v2017)*	**735** *(+247 v2017)*	**27%** *(+13% v2017)*

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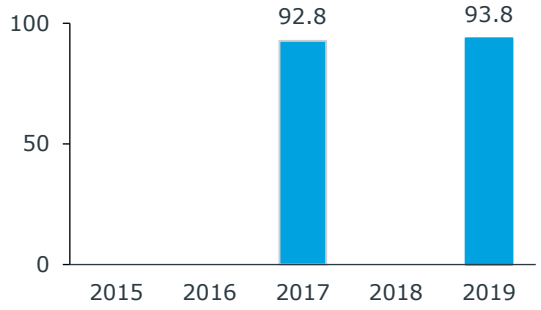
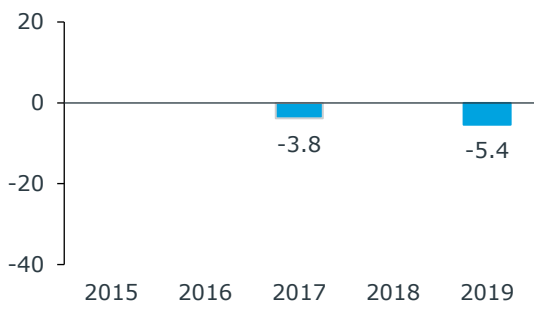
Portugal PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	93.8%	Bias	-5.4%

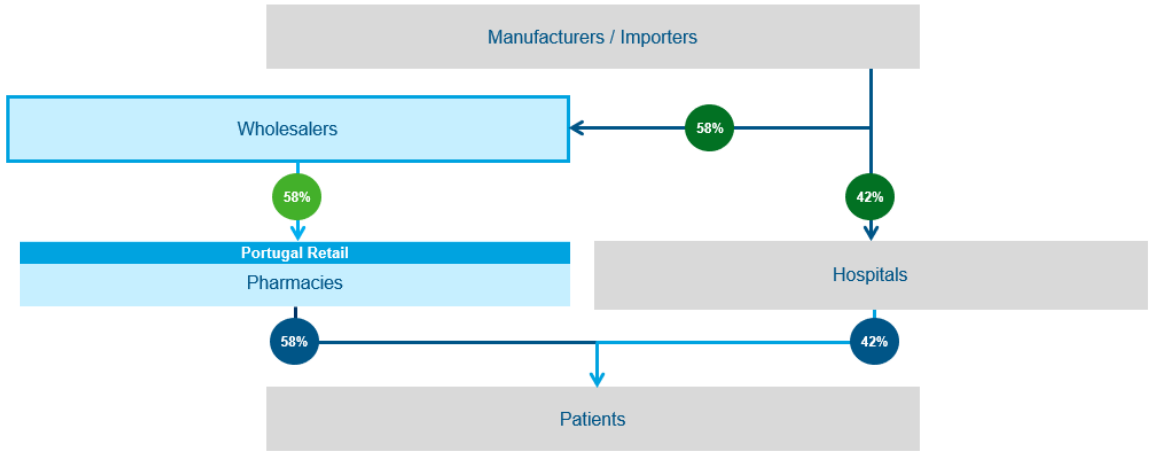




Outcomes

- Overall precision index improved by 1.0 percentage point in 2019;
- Overall underestimation increased by 1.6 percentage points in 2019;
- To review projection levels.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(+8 v2017)*	**449** *(-29 v2017)*	**17%** *(+4% v2017)*

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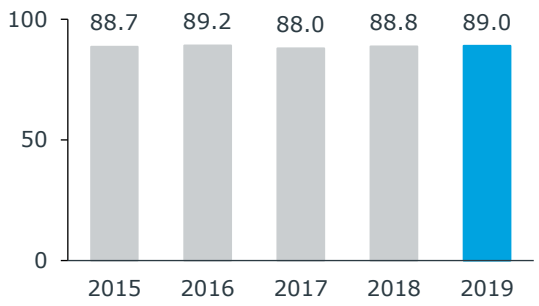
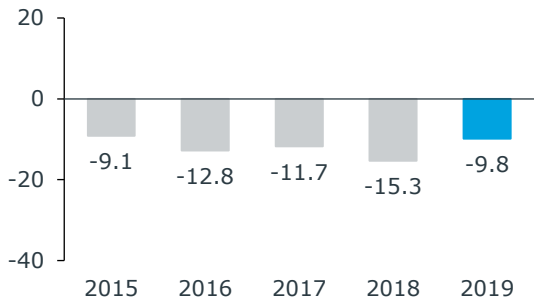
Russia Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	89%	Bias	-9.8%

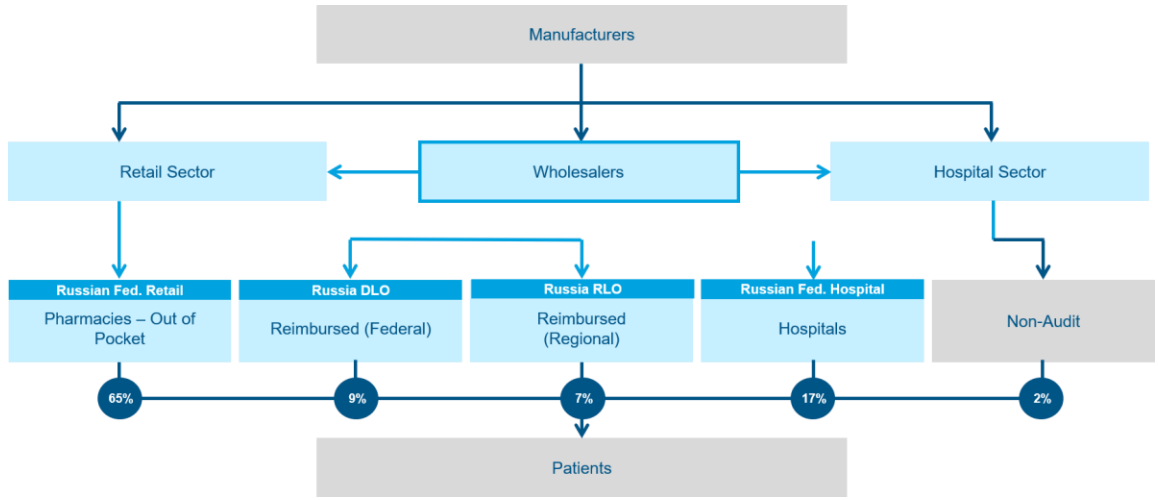




Outcomes

- Overall precision index improved by 0.2 percentage points in 2019;
- Overall underestimation improved by 5.5 percentage points in 2019;
- Implementation of the new AI/ML powered projection methodology and panel increase.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
126 *(+4 vPY)*	**2,137** *(+11 vPY)*	**39%** *(no change)*

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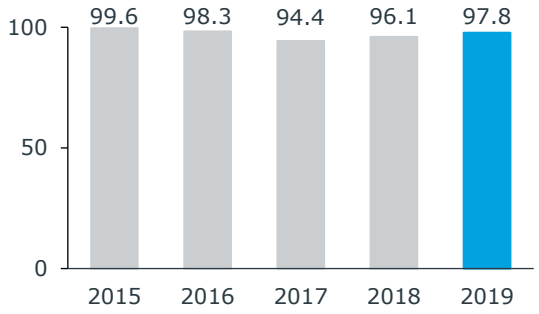
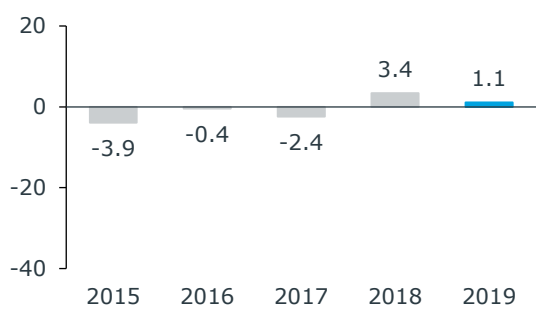
Serbia Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	97.8%	Bias	1.1%

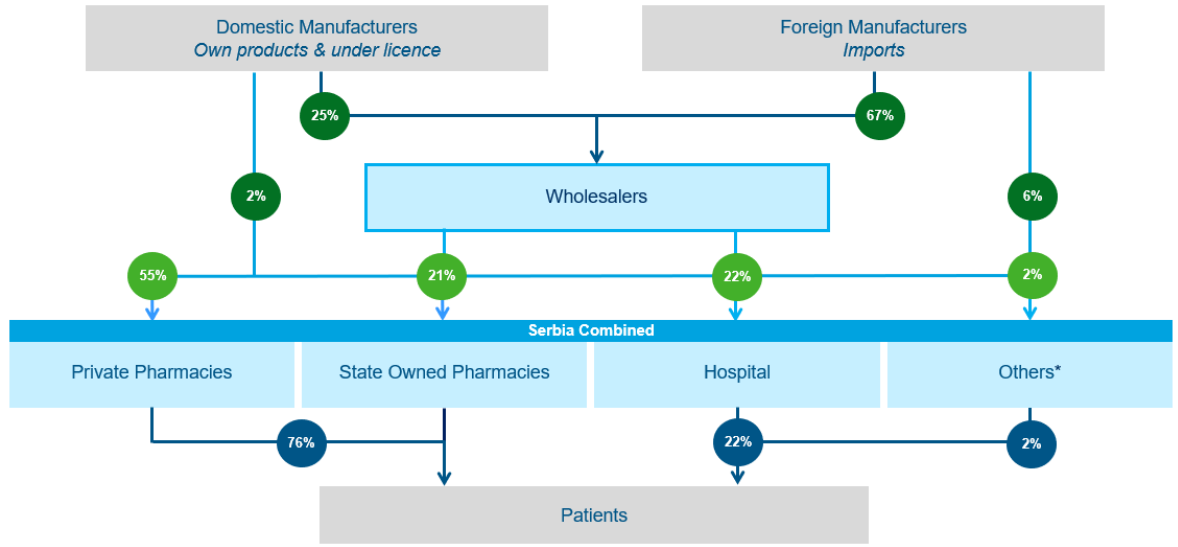




Outcomes

- Overall precision index improved by 1.7 percentage points in 2019;
- Overall overestimation improved by 2.3 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
37 *(+3 vPY)*	**886** *(+85 vPY)*	**76%** *(-2% vPY)*

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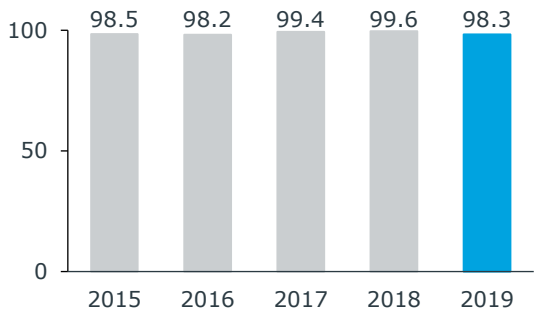
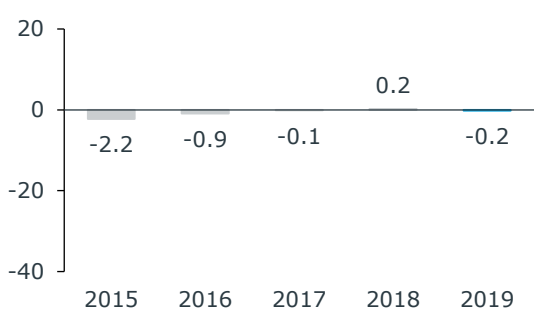
Slovakia Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	98.3%	Bias	-0.2%

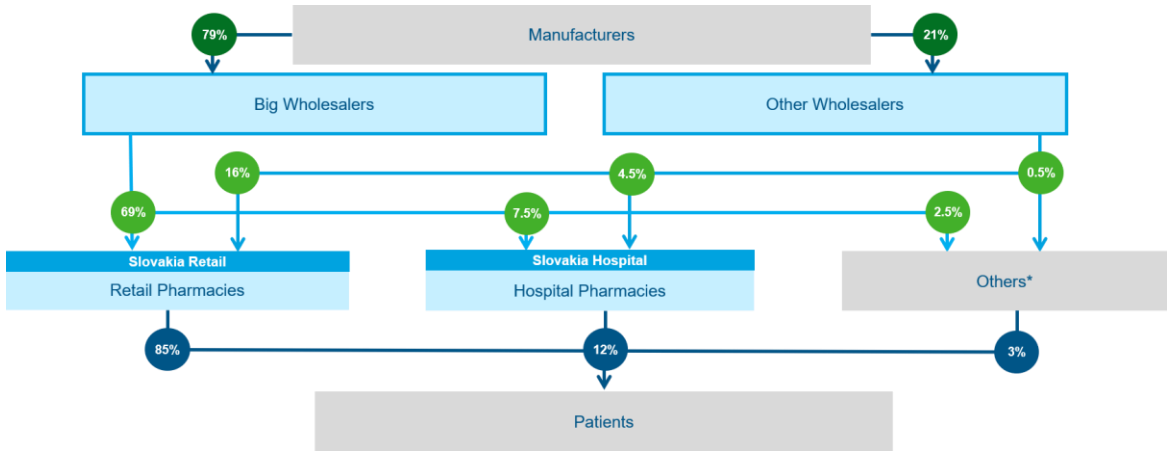




Outcomes

- Overall precision index declined by 1.3 percentage points in 2019;
- Overall bias turned from 0.2% overestimation to 0.2% underestimation in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(-3 vPY)*	**624** *(+109 vPY)*	**27%** *(+2% vPY)*

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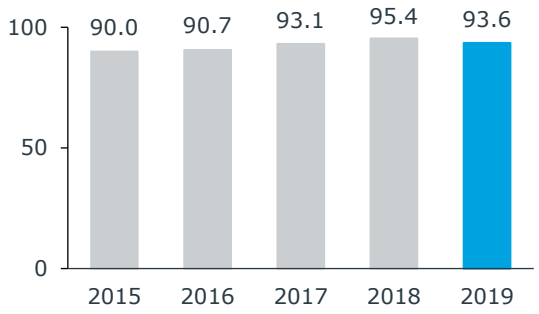
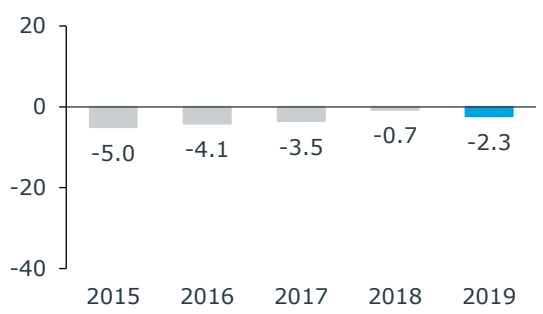
Slovakia PharmaTrend Validation Study

2019 Validation Study

Validation Results

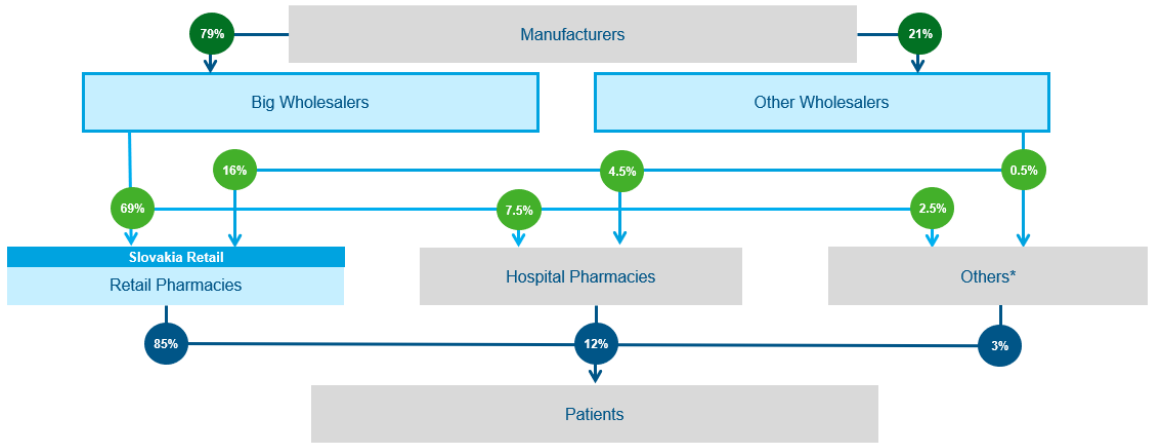
Precision	93.6%	Bias	-2.3%





Outcomes	• Overall precision index declined by 1.8 percentage points in 2019 • Overall underestimation increased by 1.6 percentage points in 2019 • To explore ways improve projection methodology to further improve precision

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(-2 vPY)*	**534** *(+93 vPY)*	**13%** *(no change vPY)*

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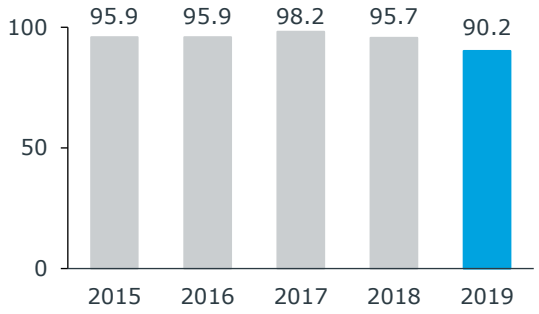
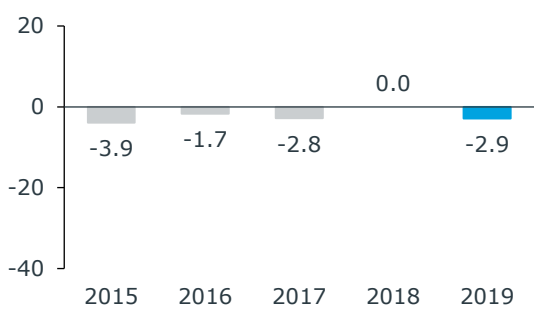
Slovakia OTC Validation Study

2019 Validation Study

Validation Results

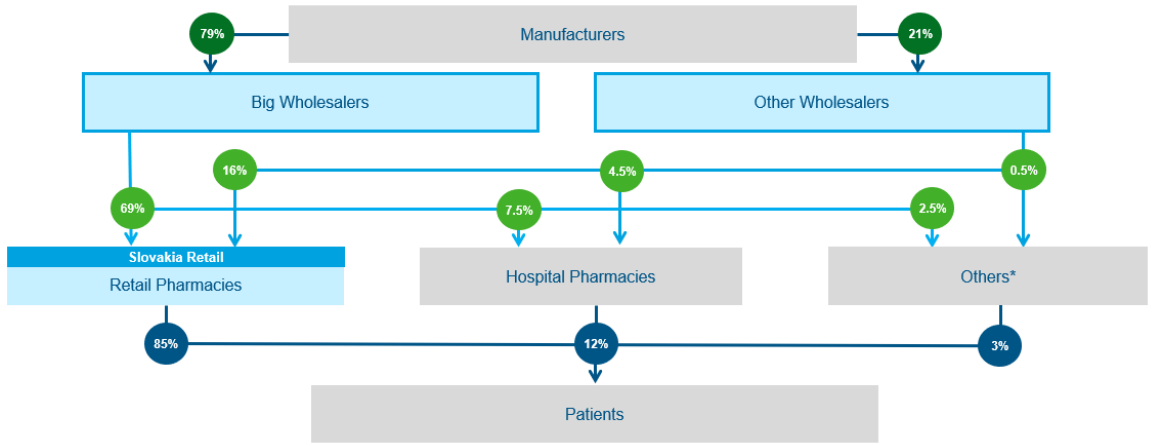
Precision	90.2%	Bias	-2.9%





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 explore ways improve projection methodology to further improve precision

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
6 *(-3 vPY)*	**88** *(-37 vPY)*	**6%** *(-3% vPY)*

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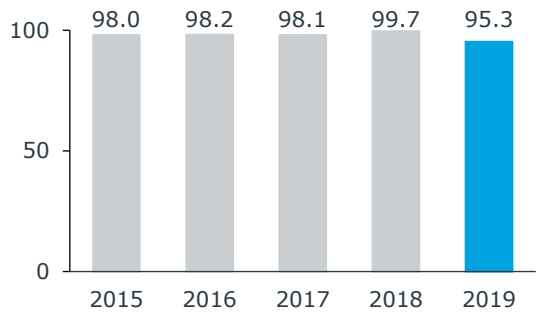
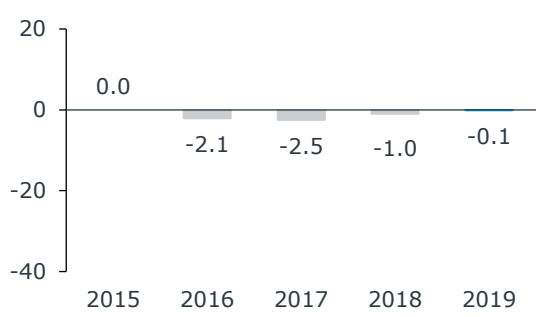
Slovenia Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	95.3%	Bias	-0.1%

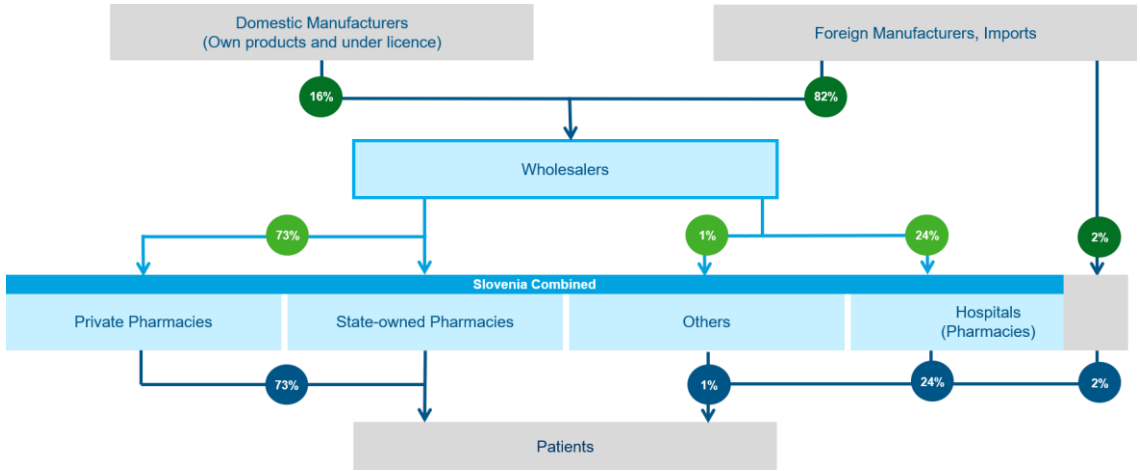




Outcomes

- Overall precision index declined by 4.4 percentage points in 2019;
- Overall underestimation improved by 0.9 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
11 *(+3 vPY)*	**244** *(+27 vPY)*	**11%** *(+1% vPY)*

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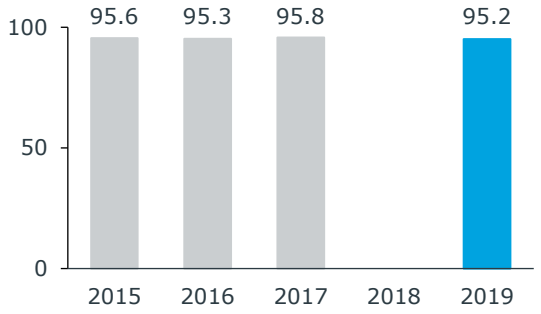
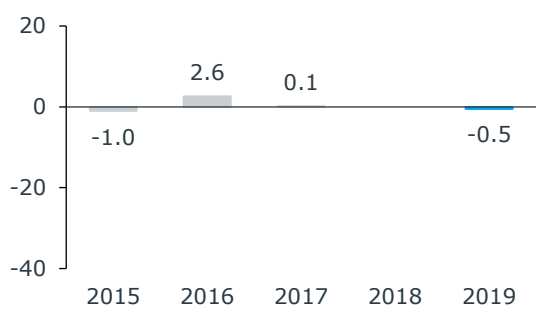
Spain Retail Validation Study

2019 Validation Study

Validation Results

Precision	95.2%	Bias	-0.5%

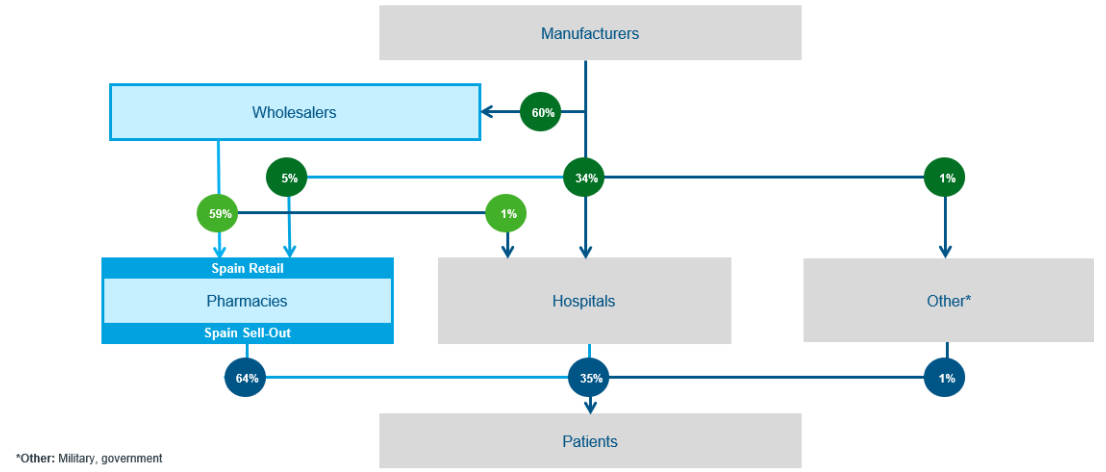




Outcomes

- Overall precision index declined by 0.6 percentage points in 2019;
- Overall bias turned from 0.1% overestimation in 2017 to 0.5% underestimation in 2019;
- Review projection levels and increase manufacturer participation on the validation.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
26 *(+8 v2017)*	**850** *(+341 v2017)*	**17%** *(+5% v2017)*

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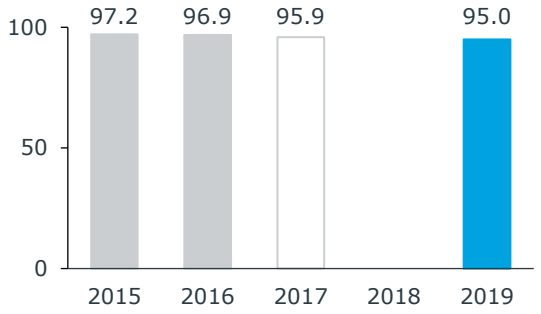
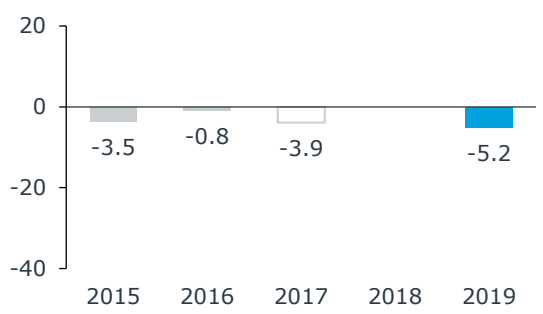
Spain PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	95.0%	Bias	-5.2%

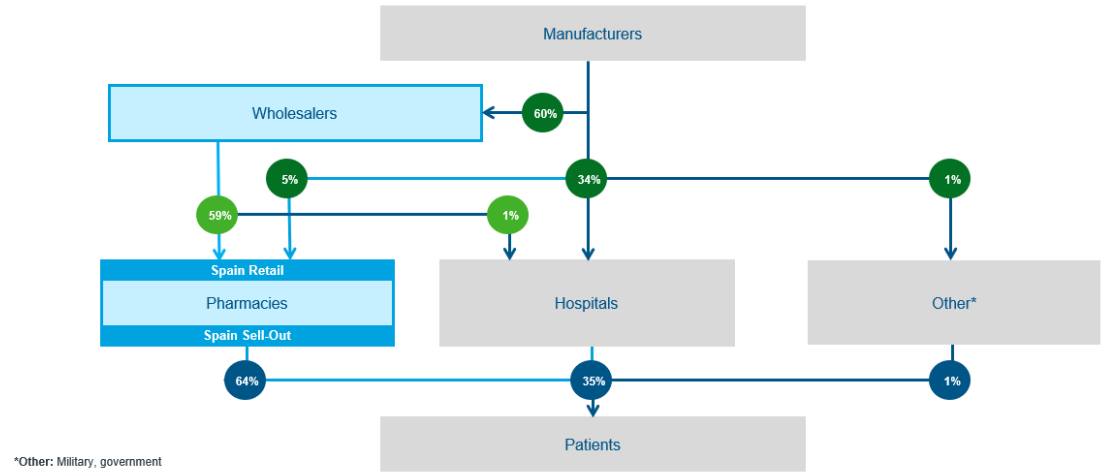




Outcomes

- Overall precision index declined by 0.9 percentage points in 2019
- Overall underestimation increased by 1.3 percentage points in 2019
- To motivate more clients to participate in the validation and explore ways improve projection methodology to further improve precision

Distribution Channels Validated



*Other: Military, government

Participation

# Participating Companies	# Forms Validated	% Market Validated
26 *(+8 v2017)*	**818** *(+331 v2017)*	**13%** *(+5% v2017)*

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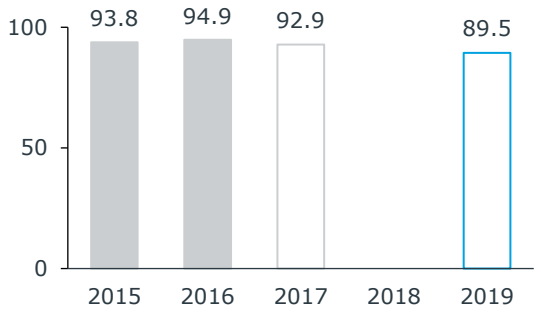
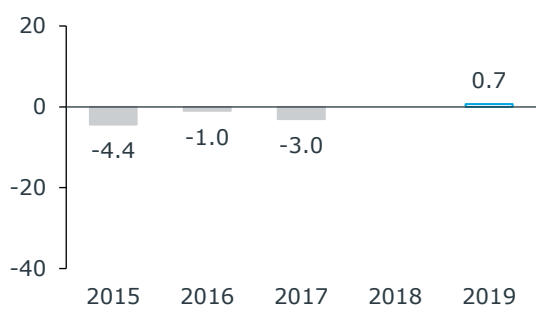
Spain OTC Validation Study

2019 Validation Study

Validation Results

Precision	89.5%	Bias	0.7%

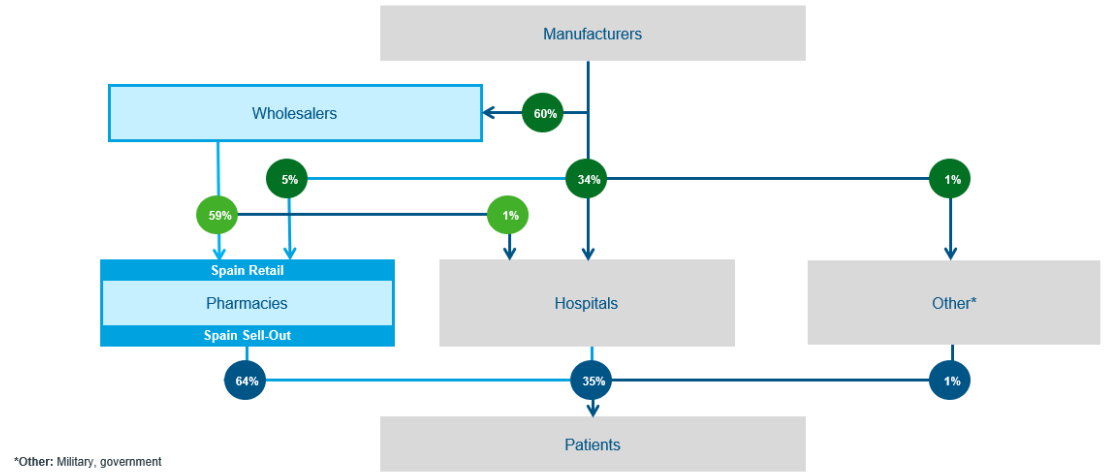




Outcomes

- Overall precision index declined by 3.4 percentage points in 2019
- Overall bias turned from 3.0% underestimation in 2017 to 0.7% overestimation in 2019
- To motivate more clients to participate in the validation and explore ways improve projection methodology to further improve precision

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
7 *(-2 v2017)*	**38** *(-18 v2017)*	**7%** *(-2% v2017)*

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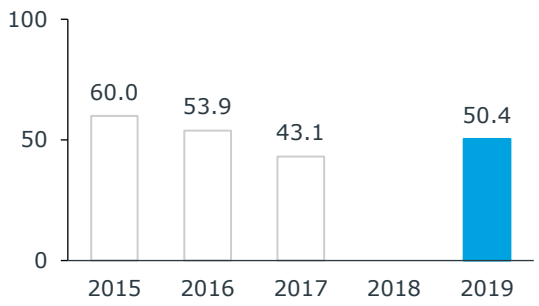
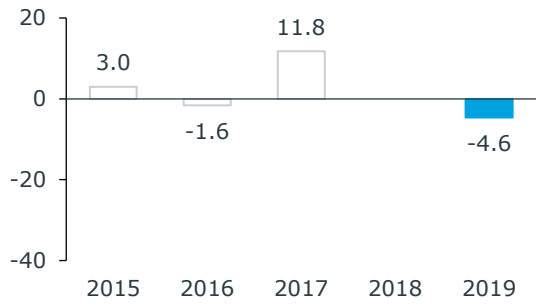
Spain Hospital Validation Study

2019 Validation Study

Validation Results

Precision	50.4%	Bias	-4.6%

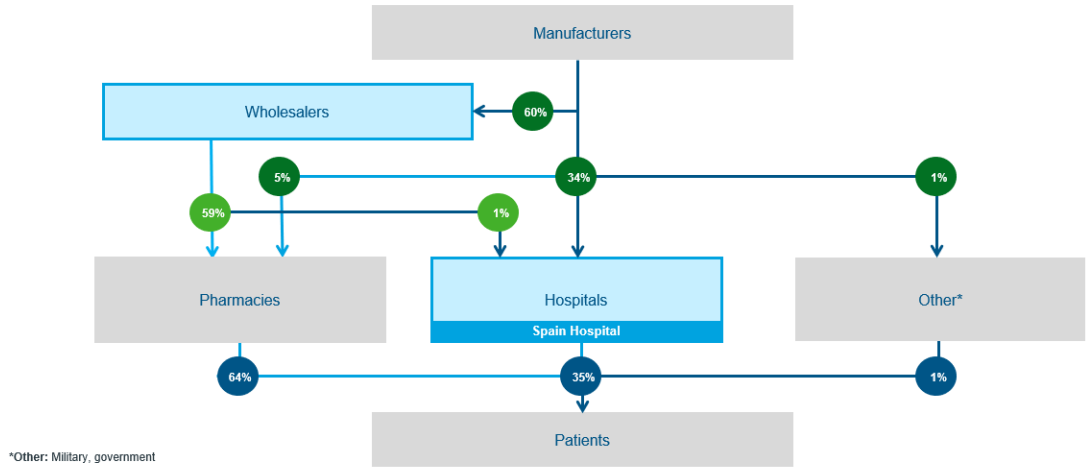




Outcomes

- Overall precision index improved by 7.3 percentage points in 2019;
- Overall bias turned from 11.8% overestimation in 2017 to 4.6% underestimation in 2019;
- Review projection levels and increase manufacturer participation on the validation.

Distribution Channels Validated



*Other: Military, government

Participation

# Participating Companies	# Forms Validated	% Market Validated
13 *(+5 v2017)*	**247** *(+106 v2017)*	**12%** *(+4% v2017)*

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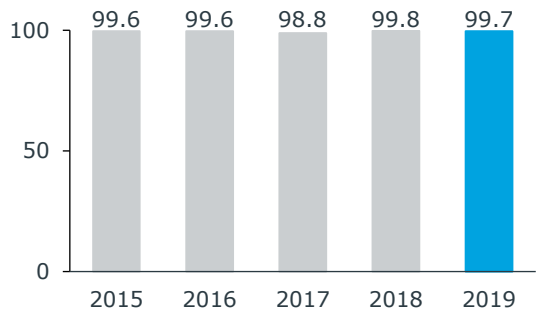
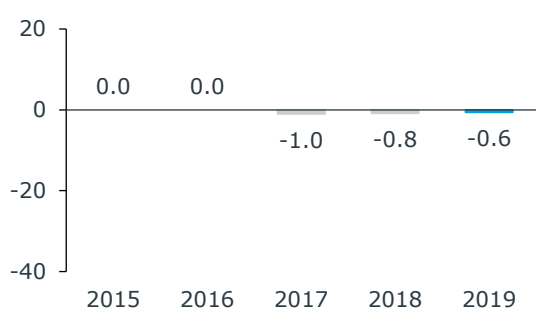
Switzerland Retail+Hospital Validation Study

2019 Validation Study

Validation Results

Precision	99.7%	Bias	-0.6%

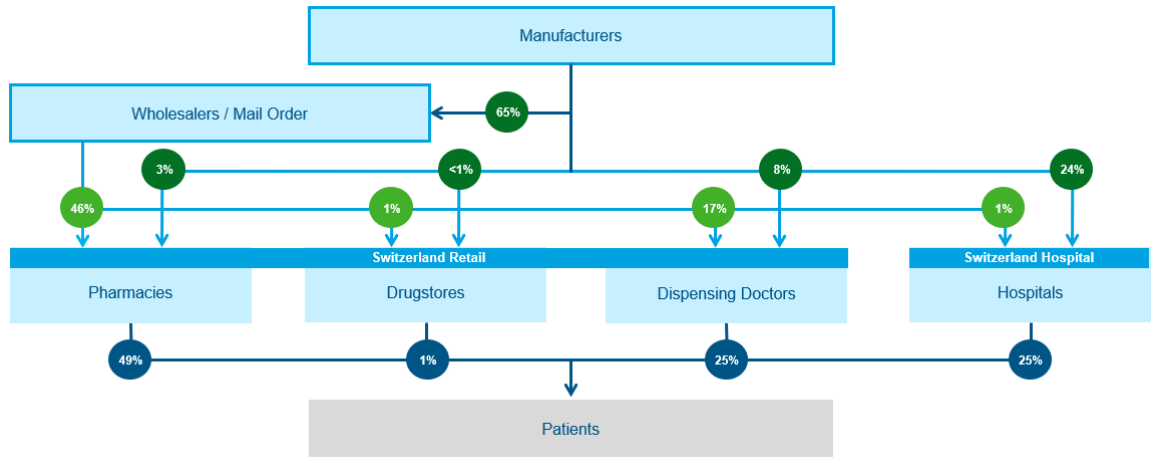




Outcomes

- Overall precision index declined by 0.1 percentage point in 2019;
- Overall underestimation improved by 0.2 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
32 *(-12 vPY)*	**1,840** *(-526 vPY)*	**44%** *(-11% vPY)*

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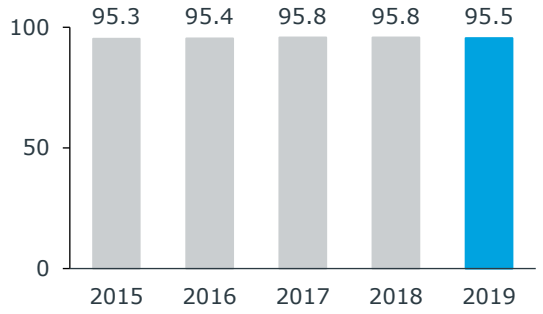
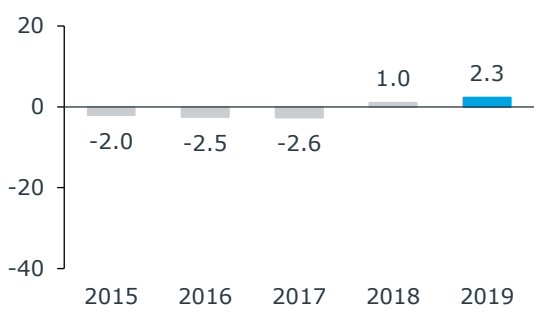
Switzerland PharmaTrend Validation Study

2019 Validation Study

Validation Results

Precision	95.5%	Bias	2.3%

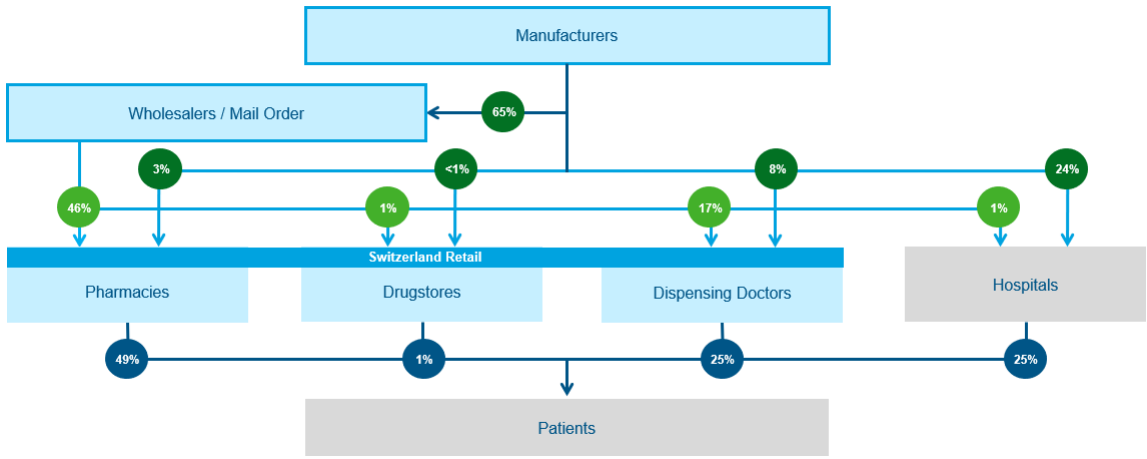




Outcomes

- Overall precision index declined by 0.3 percentage points in 2019
- Overall overestimation increased by 1.3 percentage points in 2019
- To review projection level to further improve precision

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
166 *(-6 vPY)*	**2,960** *(-99 vPY)*	**89%** *(no change vPY)*

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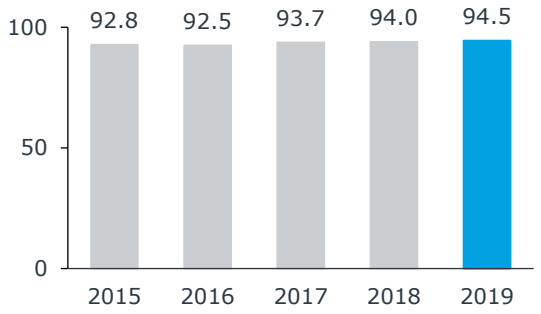
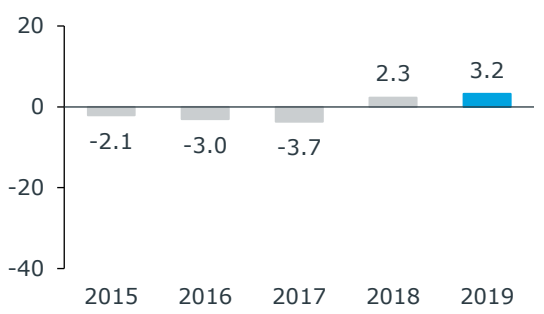
Switzerland OTC Validation Study

2019 Validation Study

Validation Results

Precision	94.5%	Bias	3.2%

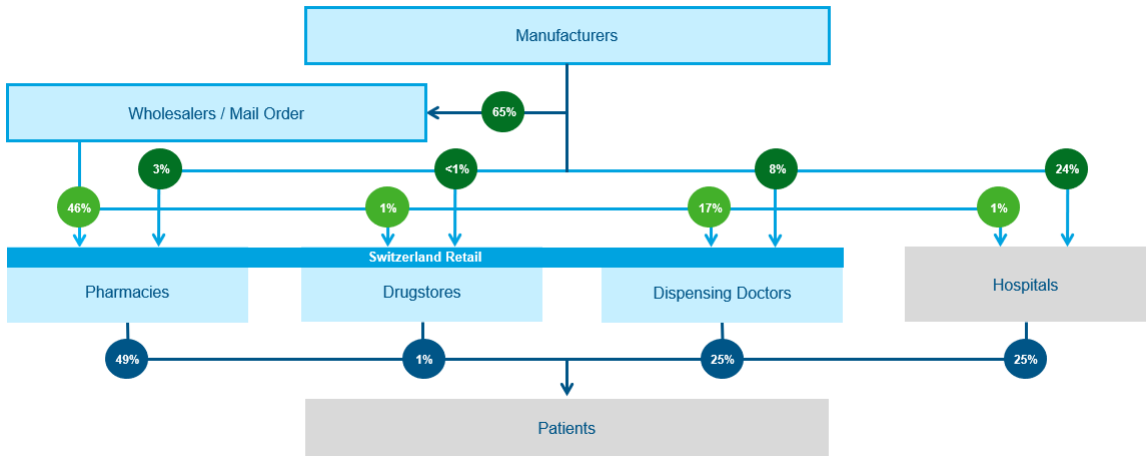




Outcomes

- Overall precision index improved by 0.5 percentage points in 2019
- Overall overestimation increased by 0.9 percentage points in 2019
- To review projection level to further improve precision

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
104 *(-7 vPY)*	**1,033** *(-83 vPY)*	**94%** *(no change vPY)*

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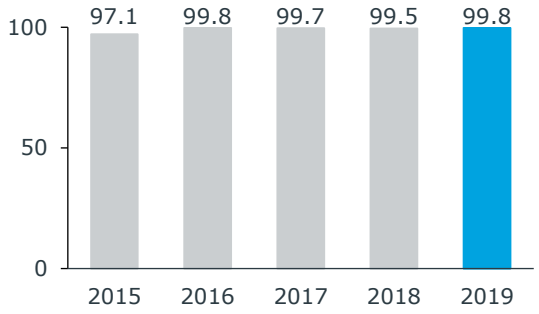
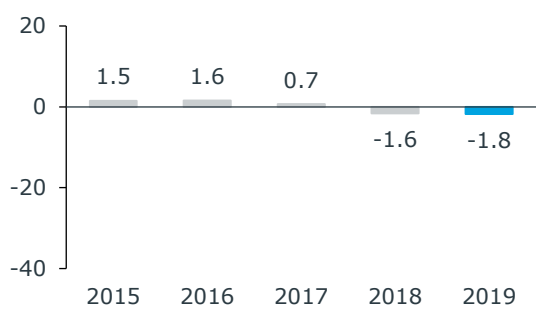
United Kingdom Retail Validation Study

2019 Validation Study

Validation Results

Precision	99.8%	Bias	-1.8%

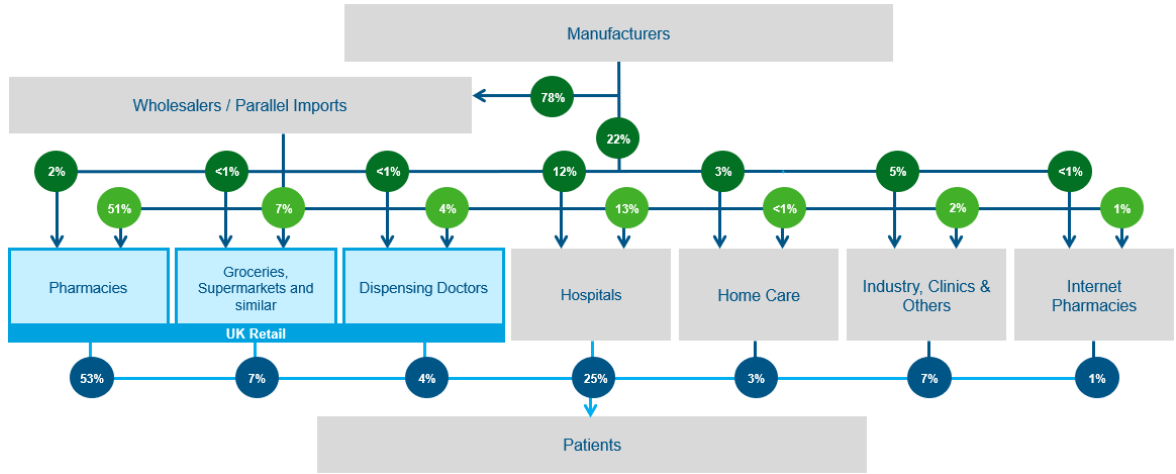




Outcomes

- Overall precision index improved by 0.3 percentage points in 2019;
- Overall underestimation increased slightly by 0.2 percentage points in 2019;
- Replatform to new technology and change projection methodology.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
57 *(+2 vPY)*	**294** *(-20 vPY)*	**21%** *(+1% vPY)*

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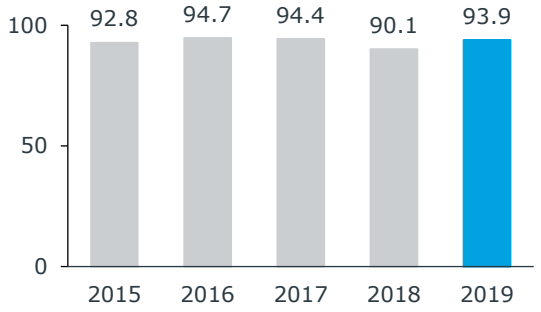
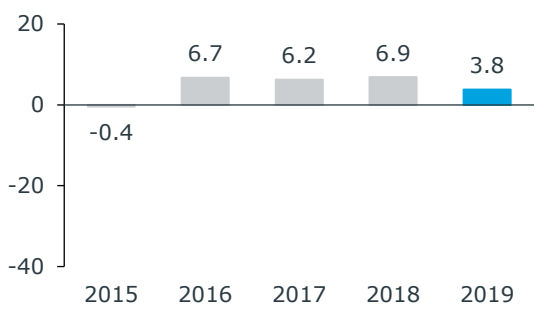
United Kingdom Hospital Validation Study

2019 Validation Study

Validation Results

Precision	93.9%	Bias	3.8%

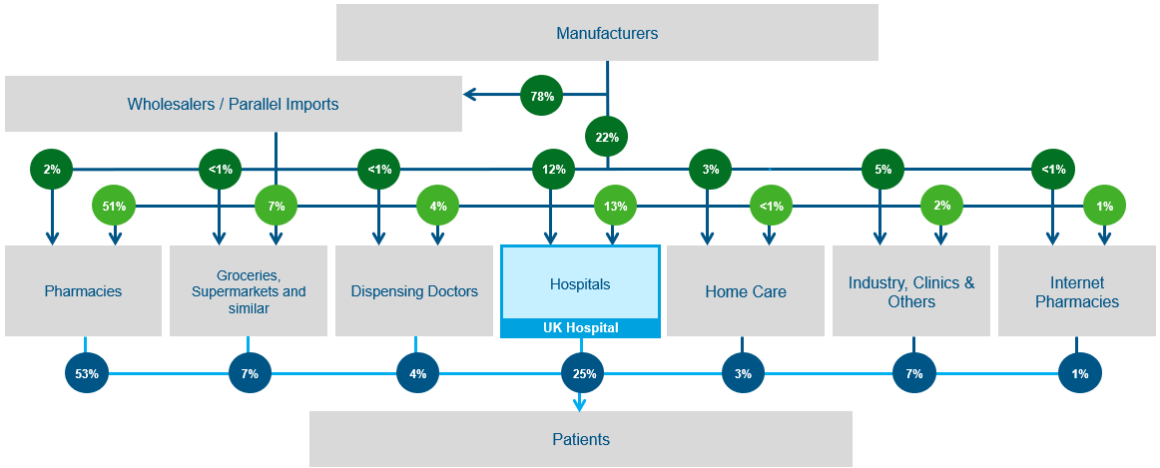




Outcomes

- Overall precision index improved by 3.8 percentage points in 2019;
- Overall overestimation improved by 3.1 percentage points in 2019;
- Explore NHS data for validation.

Distribution Channels Validated

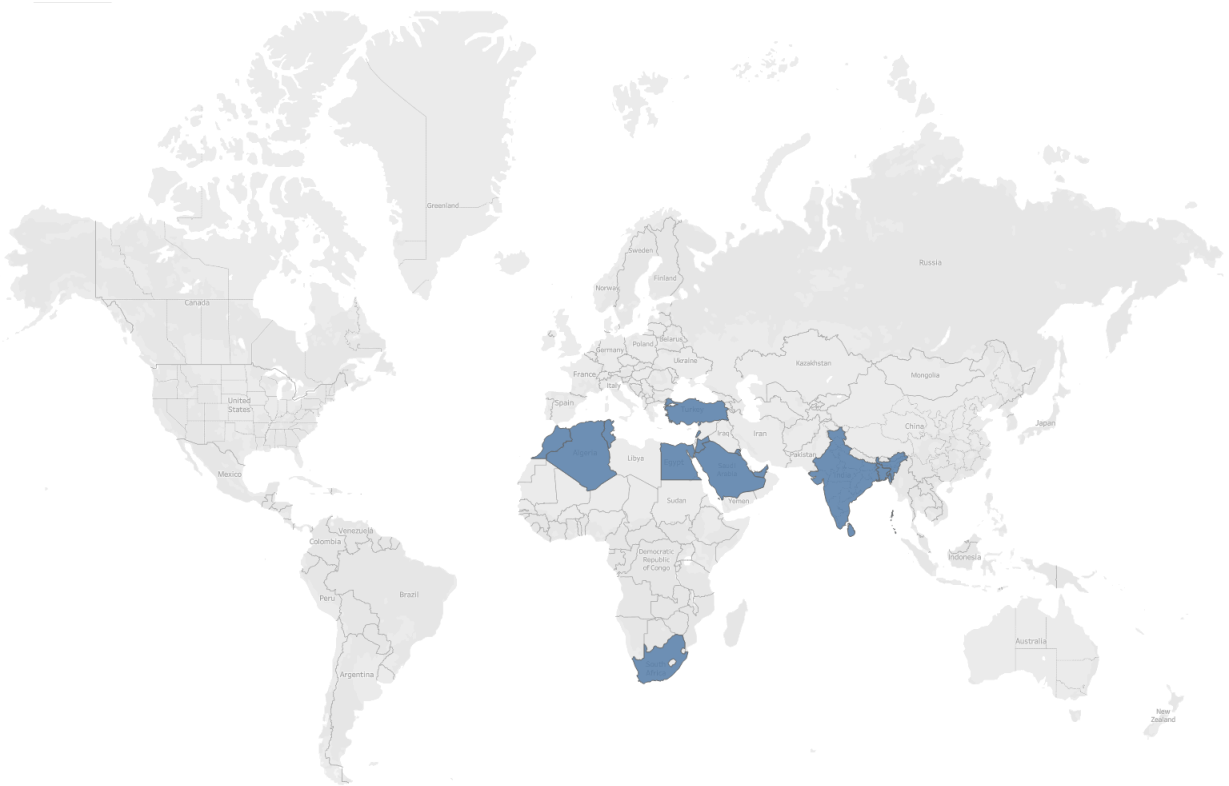


Participation

# Participating Companies	# Forms Validated	% Market Validated
74 *(+1 vPY)*	**413** *(-40 vPY)*	**11%** *(-6% vPY)*

Back

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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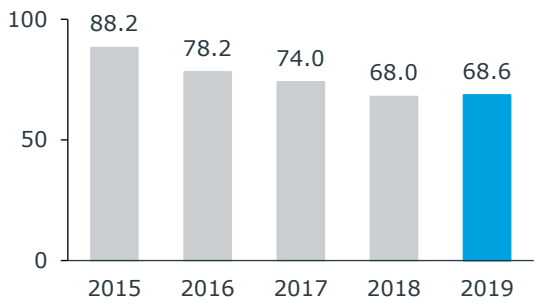
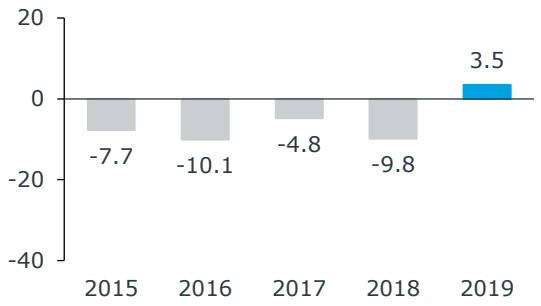
Algeria Retail Validation Study

2019 Validation Study

Validation Results

Precision	68.6%	Bias	3.5%

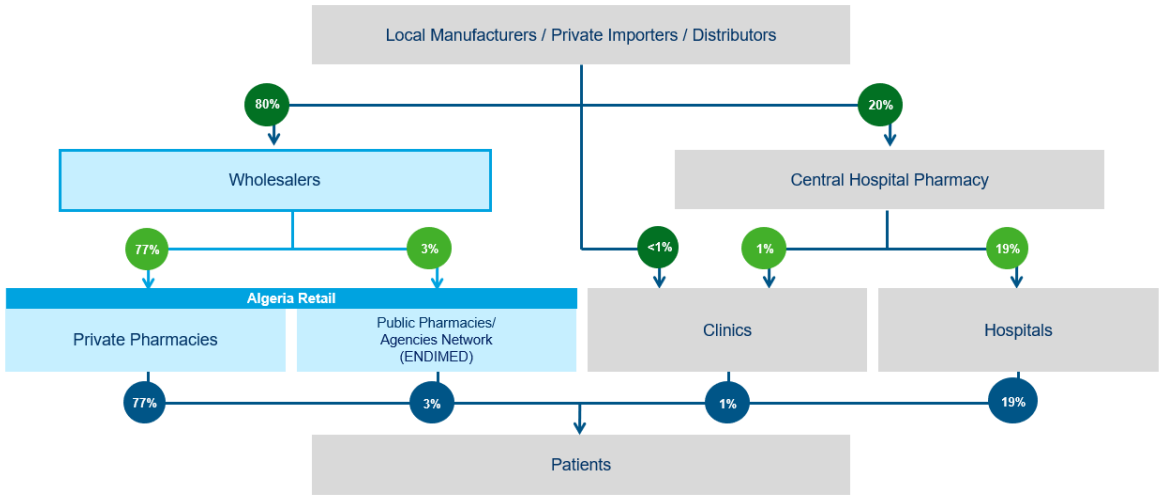




Outcomes

- Overall precision index improved by 0.6 percentage points in 2019;
- Overall bias turned from 9.8% underestimation to 3.5% overestimation in 2019;
- Review projection levels.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(-4 vPY)*	**369** *(-78 vPY)*	**32%** *(-4% vPY)*

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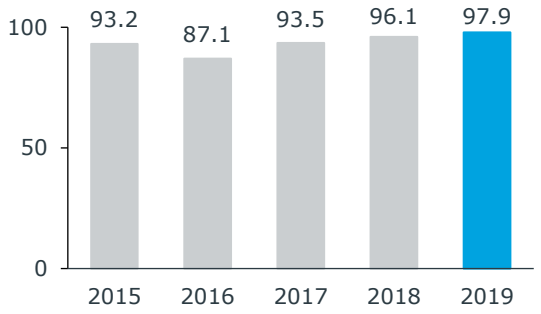
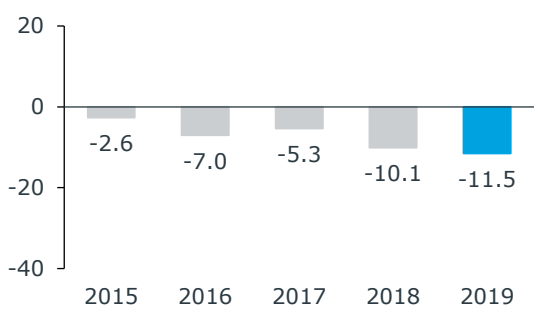
Morocco Retail Validation Study

2019 Validation Study

Validation Results

Precision	97.9%	Bias	-11.5%

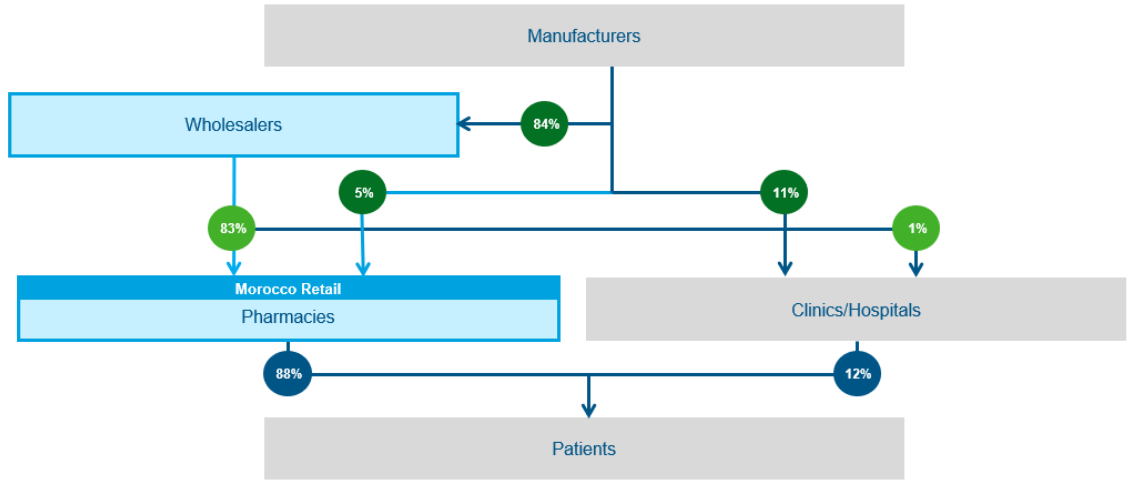




Outcomes

- Overall precision index improved by 1.8 percentage points in 2019;
- Overall underestimation increased by 1.4 percentage points in 2019;
- Motivate more clients to participate in the validation study.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
27 *(-19 vPY)*	**269** *(-167 vPY)*	**19%** *(-7% vPY)*

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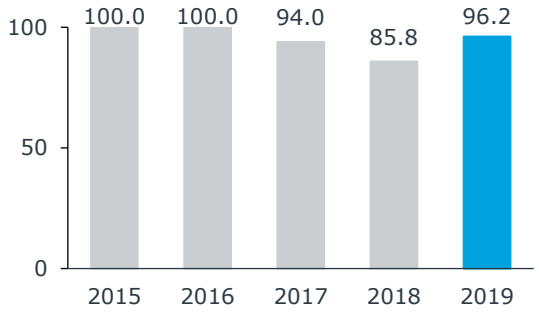
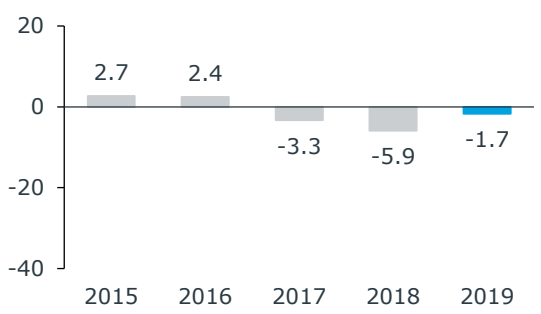
South Africa Total Private Market Validation Study

2019 Validation Study

Validation Results

Precision	96.2%	Bias	-1.7%

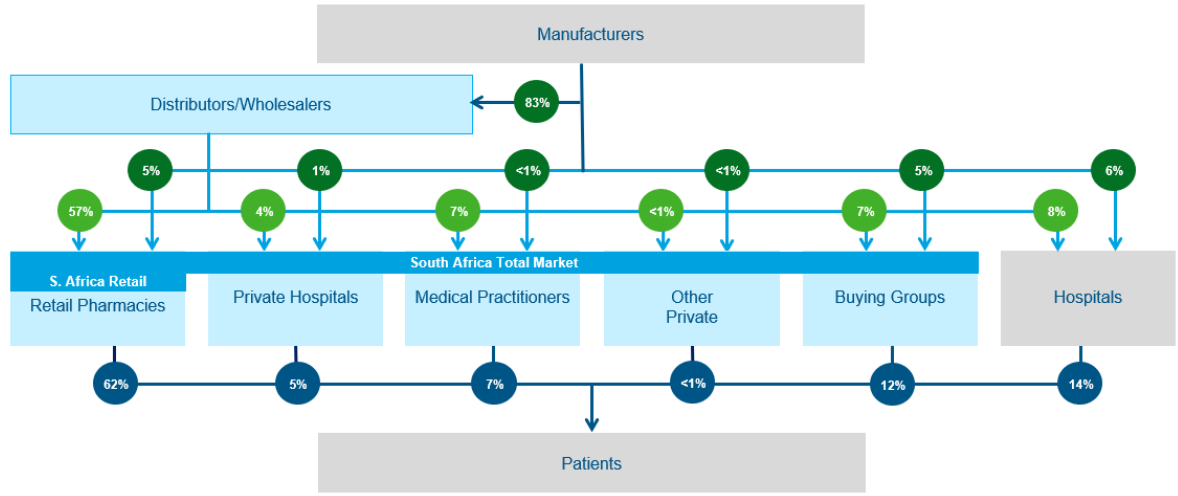




Outcomes

- Overall precision index improved by 10.4 percentage points in 2019;
- Overall underestimation improved by 4.2 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
27 *(-3 vPY)*	**1,185** *(+123 vPY)*	**30%** *(+6% vPY)*

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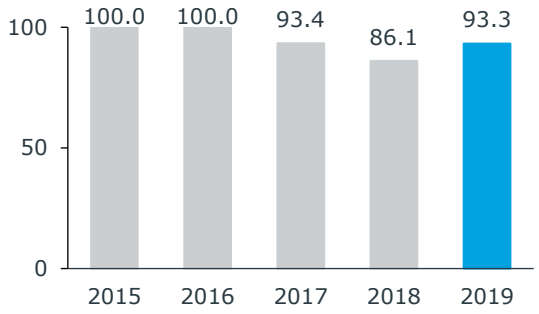
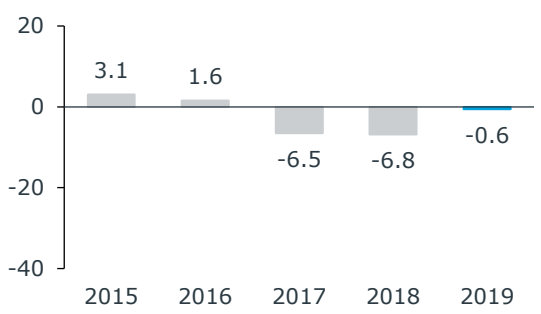
South Africa OTC Validation Study

2019 Validation Study

Validation Results

Precision	93.3%	Bias	-0.6%

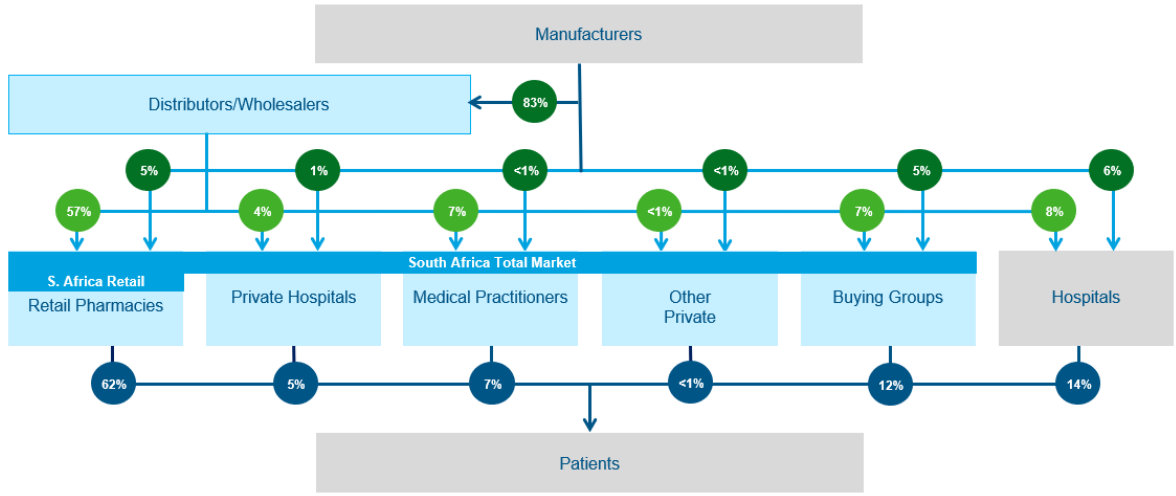




Outcomes

- Overall precision index improved by 7.2 percentage points in 2019;
- Overall underestimation improved by 6.2 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
20 *(-3 vPY)*	**207** *(-120 vPY)*	**18%** *(no change vPY)*

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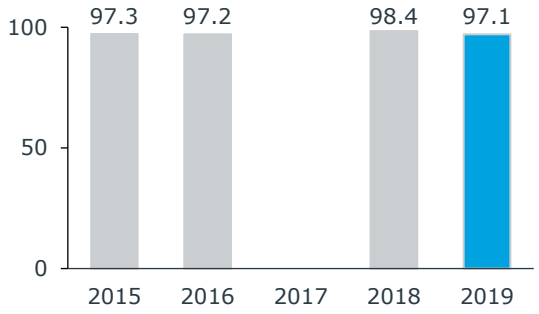
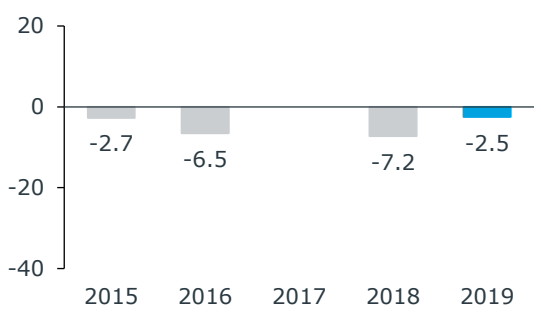
Tunisia Retail Validation Study

2019 Validation Study

Validation Results

Precision	97.1%	Bias	-2.5%

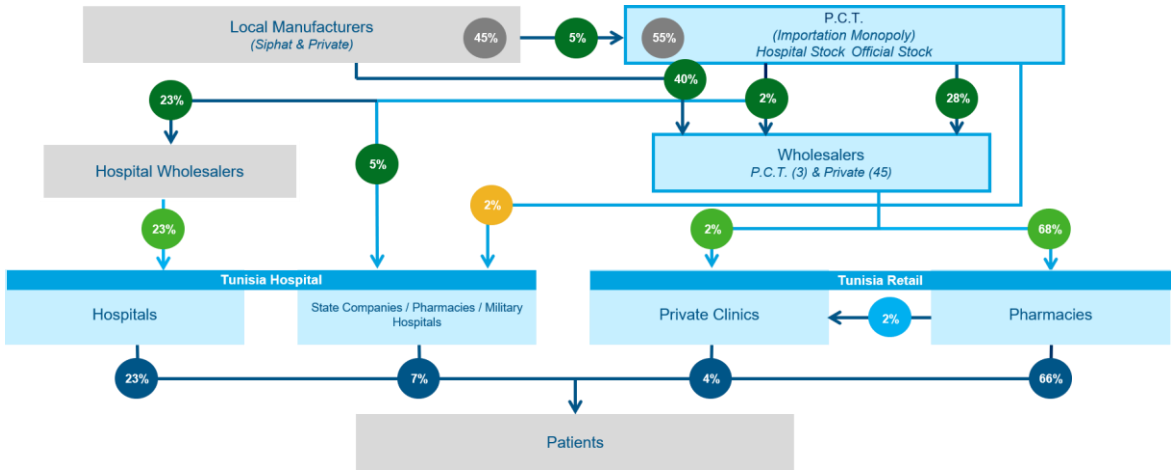




Outcomes

- Overall precision index decreased by 1.3 percentage points in 2019;
- Overall underestimation improved by 4.7 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
27 *(+1 vPY)*	**844** *(+25 vPY)*	**56%** *(+3% vPY)*

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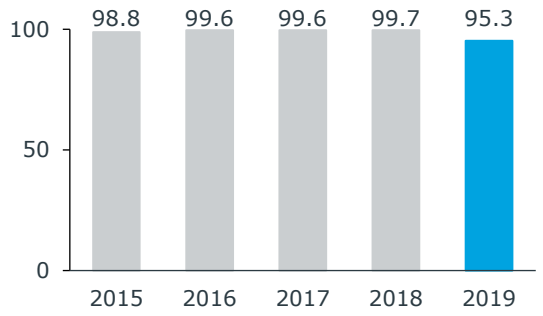
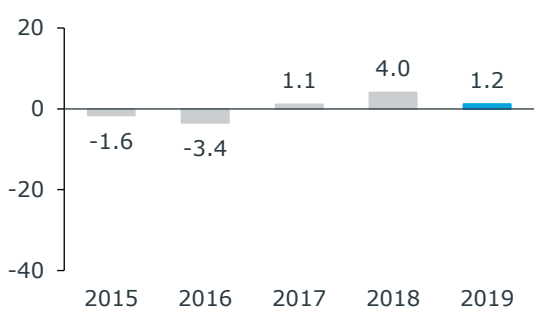
Egypt Retail Validation Study

2019 Validation Study

Validation Results

Precision	95.3%	Bias	1.2%

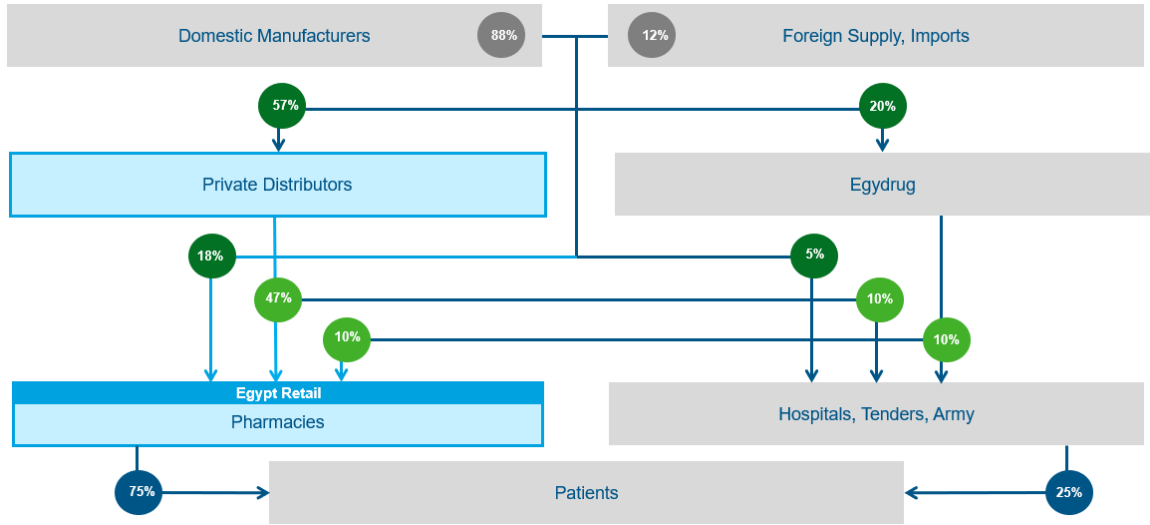




Outcomes

- Overall precision index declined by 4.4 percentage points in 2019;
- Overall overestimation improved by 2.8 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
37 *(+11 vPY)*	**490** *(+138 vPY)*	**22%** *(+5% vPY)*

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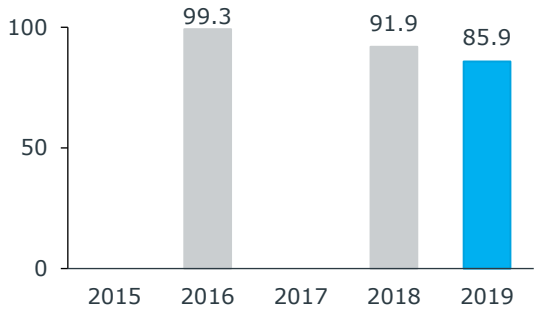
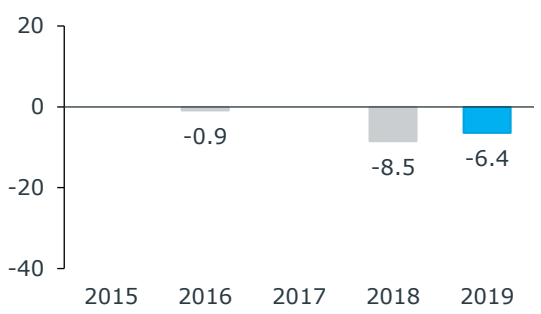
Jordan Retail Validation Study

2019 Validation Study

Validation Results

Precision	85.9%	Bias	-6.4%

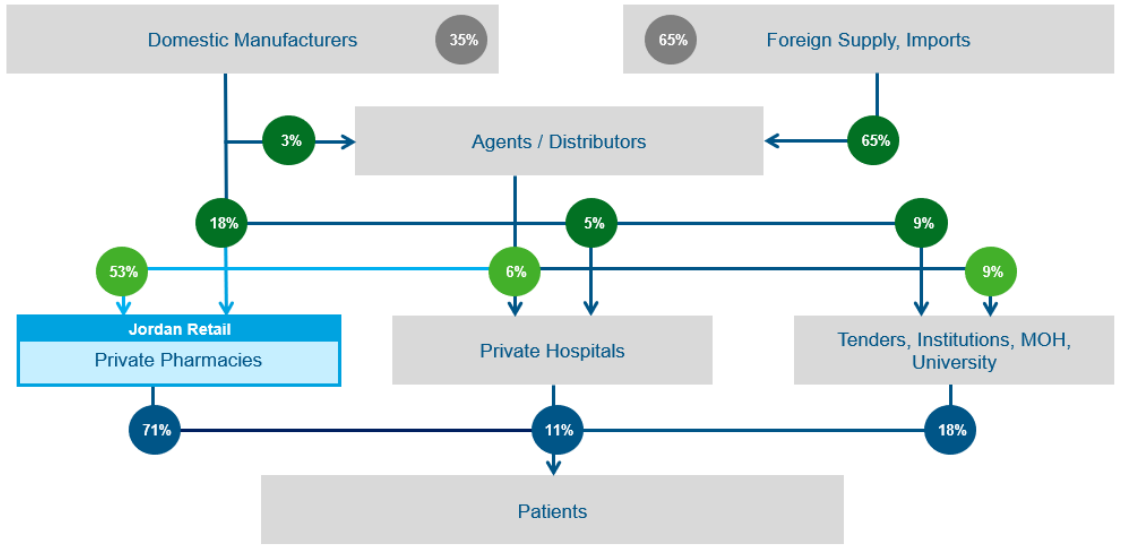




Outcomes

- Overall precision index declined by 6 percentage points in 2019;
- Overall underestimation improved by 2.1 percentage points in 2019;
- Consider use of pharmacy chain data and review projection level.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(+7 vPY)*	**339** *(+67 vPY)*	**22%** *(+7% vPY)*

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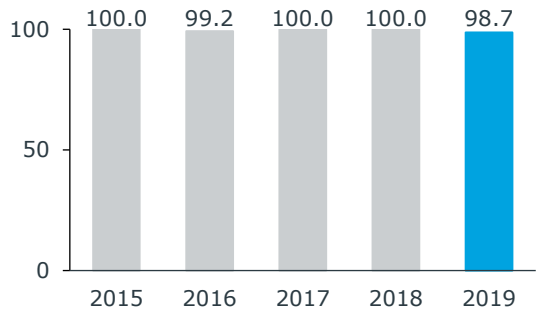
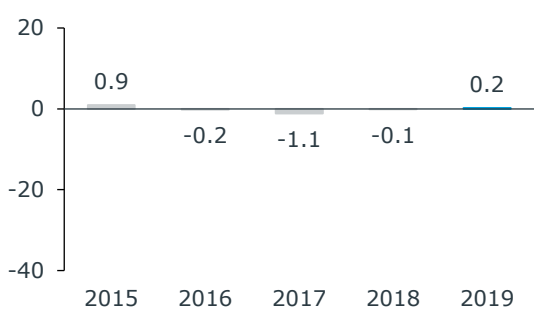
Kuwait Retail Validation Study

2019 Validation Study

Validation Results

Precision	98.7%	Bias	0.2%

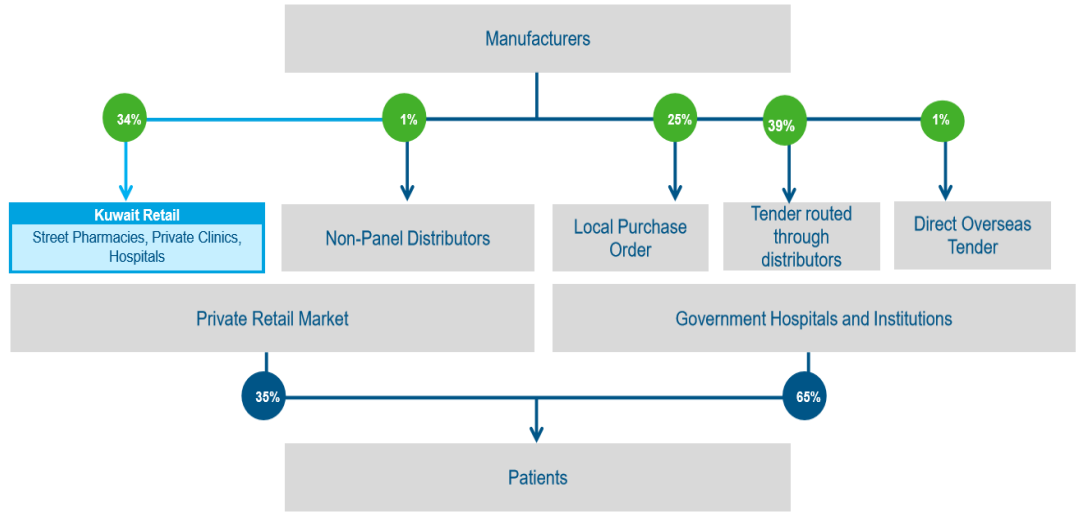




Outcomes

- Overall precision index declined by 1.3 percentage points in 2019;
- Overall bias turned from 0.1% underestimation in 2018 to 0.2% overestimation in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(+6 vPY)*	**366** *(+93 vPY)*	**27%** *(+6% vPY)*

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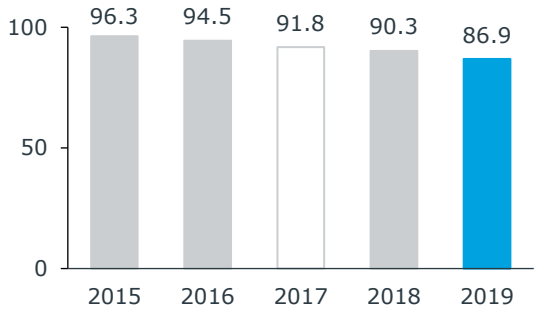
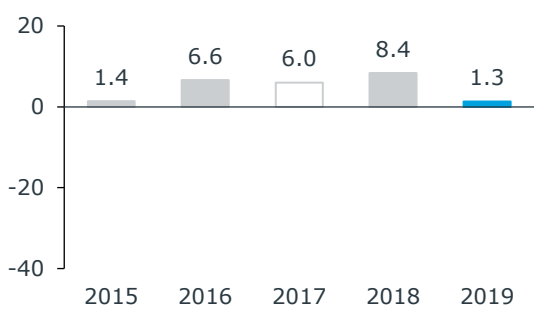
Lebanon Retail Validation Study

2019 Validation Study

Validation Results

Precision	86.9%	Bias	1.3%

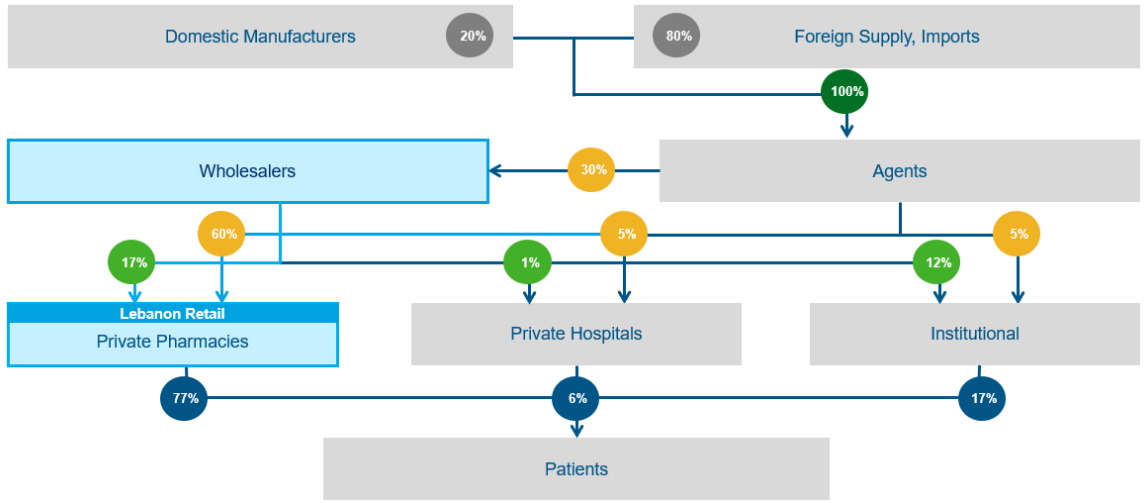




Outcomes

- Overall precision index declined by 3.4 percentage points in 2019;
- Overall overestimation improved by 7.1 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
33 *(+15 vPY)*	**501** *(+147 vPY)*	**25%** *(+10% vPY)*

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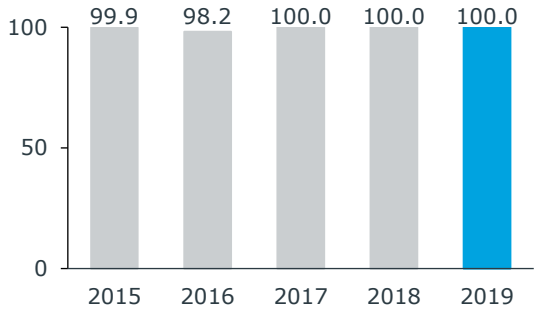
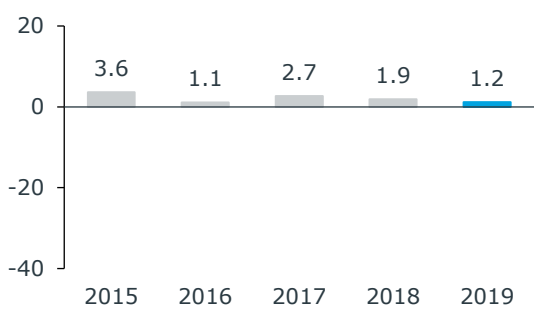
Saudi Arabia Retail Validation Study

2019 Validation Study

Validation Results

Precision	100.0%	Bias	1.2%

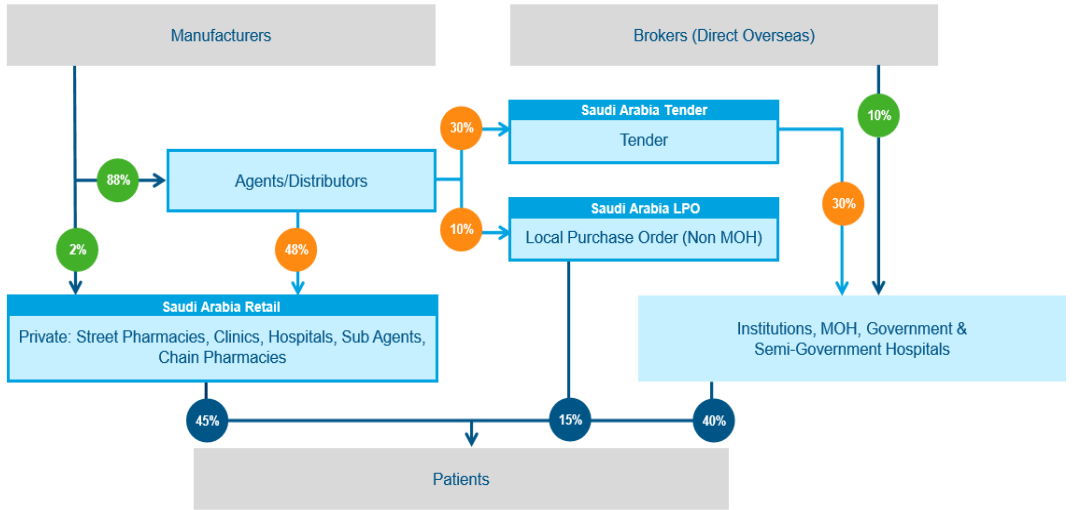




Outcomes

- Overall precision index remained unchanged at 100% in 2019;
- Overall overestimation improved by 0.7 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
34 *(-63 vPY)*	**499** *(-646 vPY)*	**33%** *(-41% vPY)*

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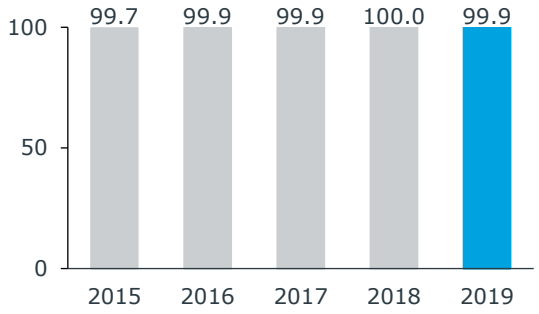
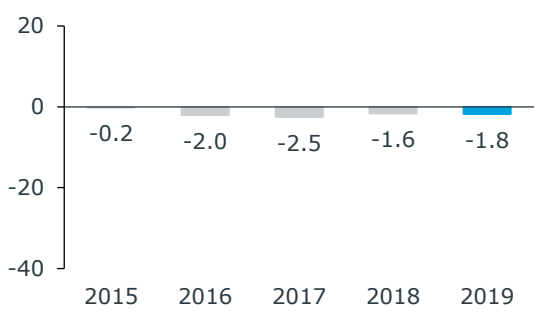
Turkey Retail Validation Study

2019 Validation Study

Validation Results

Precision	99.9%	Bias	-1.8%

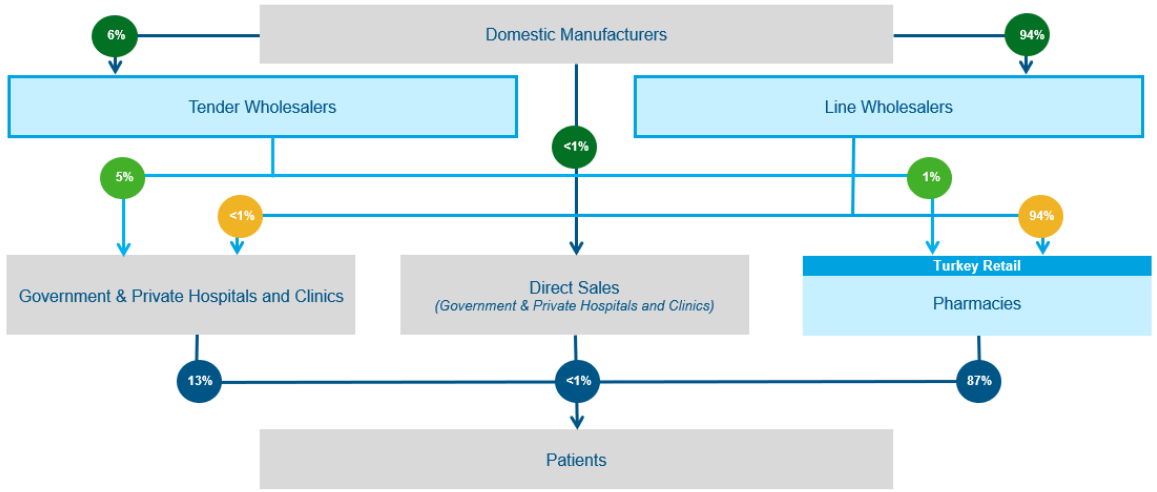




Outcomes

- Overall precision index declined by 0.1 percentage points in 2019;
- Overall underestimation increased by 0.2 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
64 *(+4 vPY)*	**1,274** *(+142 vPY)*	**54%** *(+3% vPY)*

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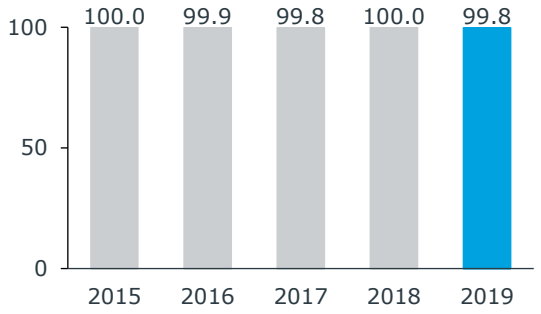
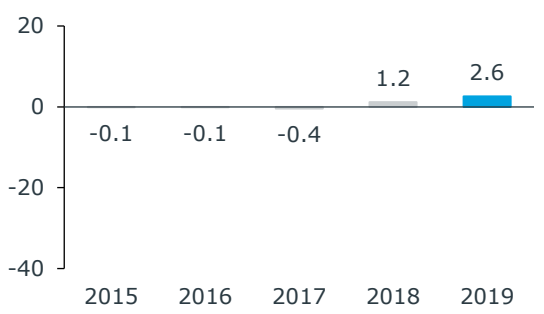
United Arab Emirates Retail Validation Study

2019 Validation Study

Validation Results

Precision	99.8%	Bias	2.6%

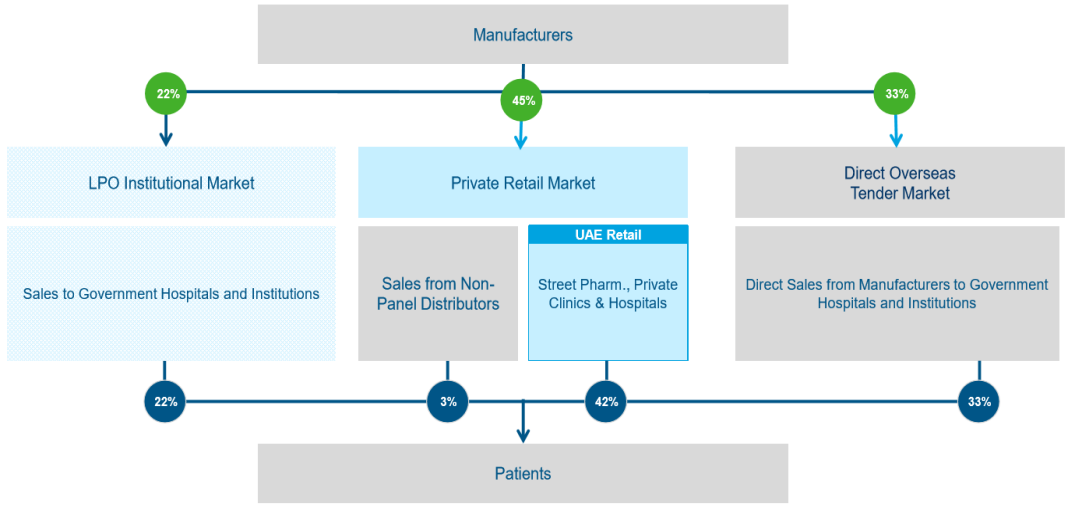




Outcomes

- Overall precision index declined by 0.2 percentage points in 2019;
- Overall overestimation increased by 1.4 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
22 *(+3 vPY)*	**551** *(+57 vPY)*	**22%** *(+3% vPY)*

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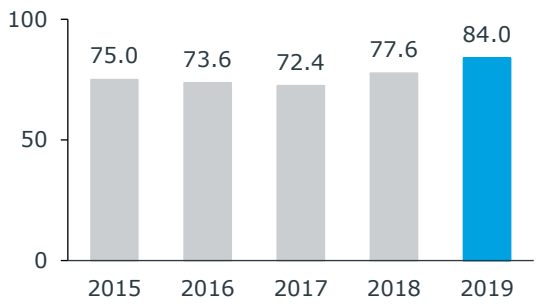
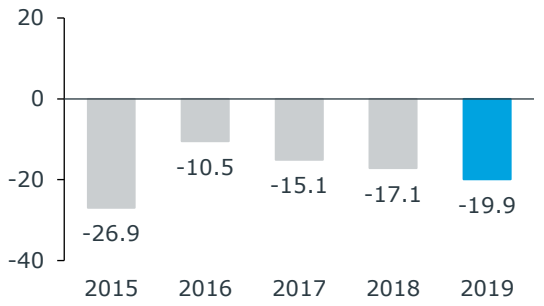
Bangladesh Retail Validation Study

2019 Validation Study

Validation Results

Precision	84.0%	Bias	-19.9%

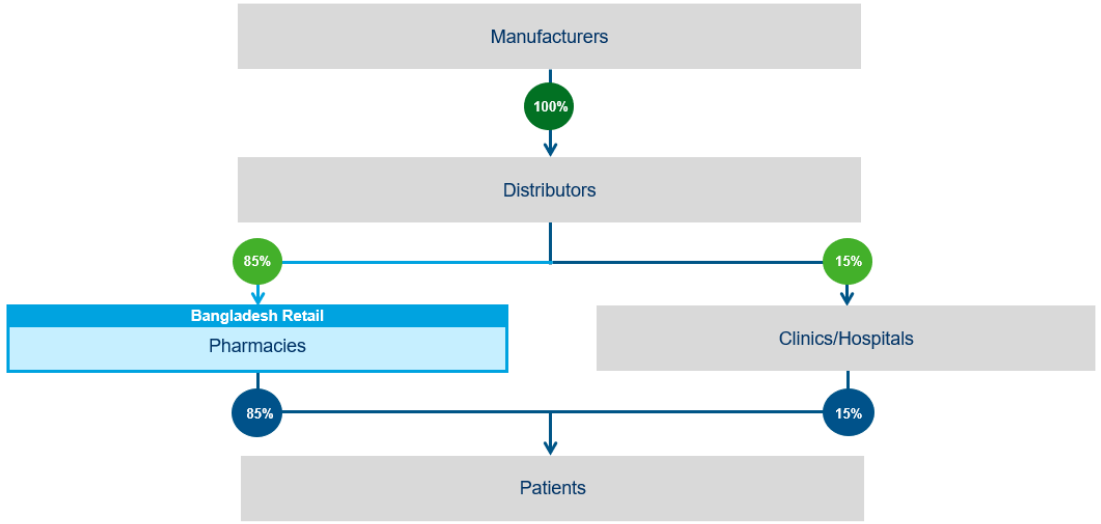




Outcomes

- Overall precision index improved by 6.4 percentage points in 2019;
- Overall underestimation increased by 2.8 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
16 *(+4 vPY)*	**2,025** *(+432 vPY)*	**47%** *(+13% vPY)*

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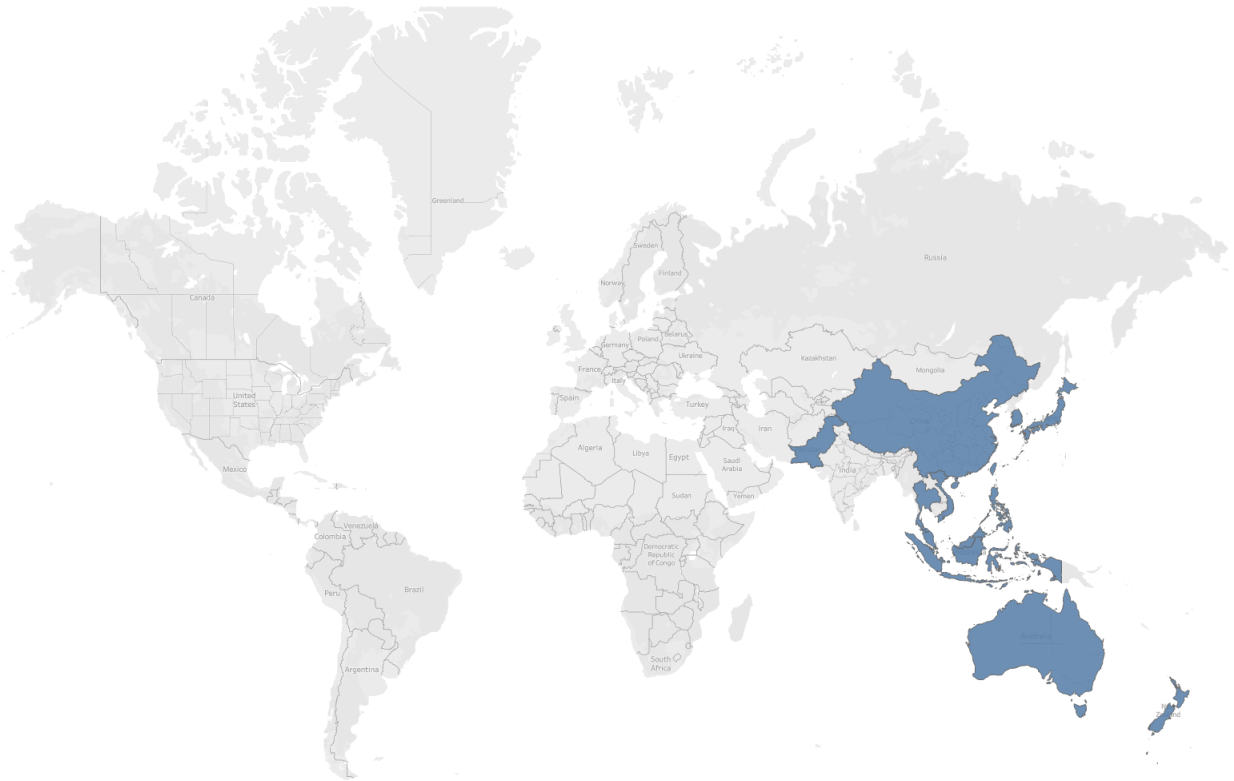
Asia Pacific



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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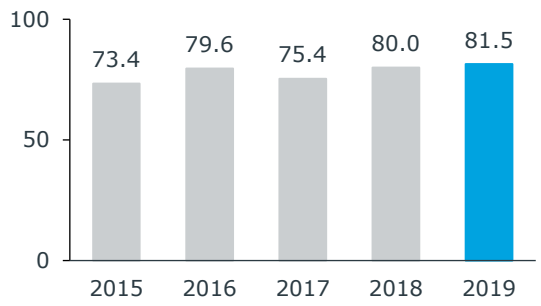
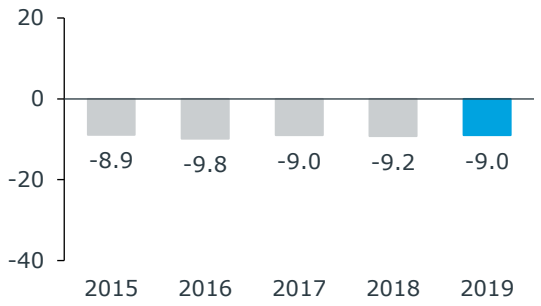
Hong Kong Retail Validation Study

2019 Validation Study

Validation Results

Precision	81.5%	Bias	-9.0%

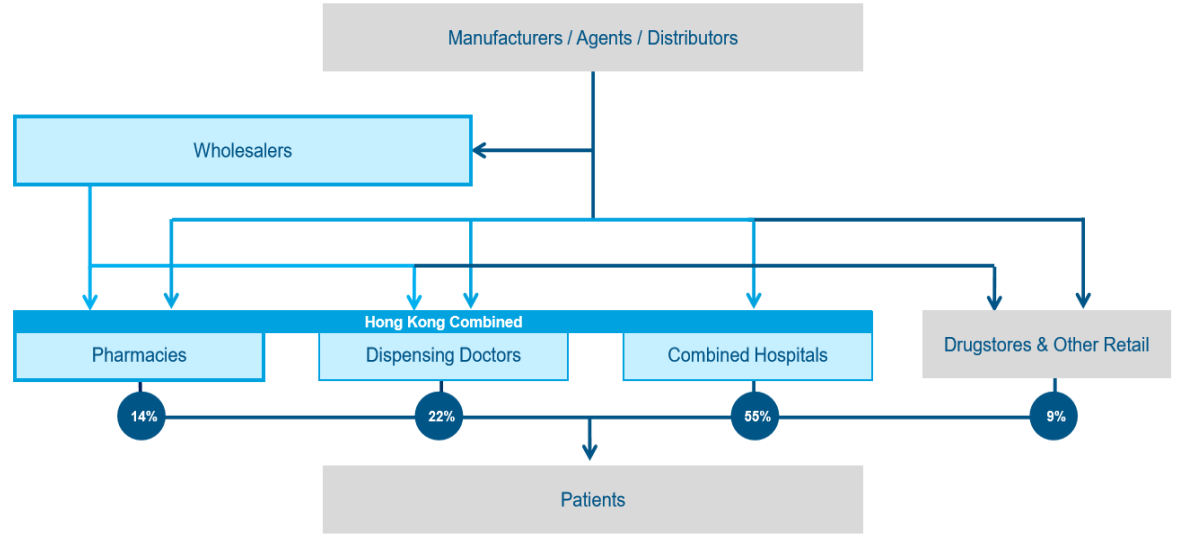




Outcomes

- Overall precision index improved by 1.5 percentage points in 2019
- Overall underestimation improved by 0.2 percentage points in 2019
- No action required from the statistical point of view

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
39 *(+2 vPY)*	**779** *(+17 vPY)*	**30%** *(no change vPY)*

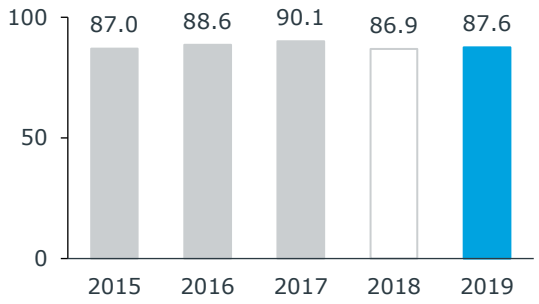
Back

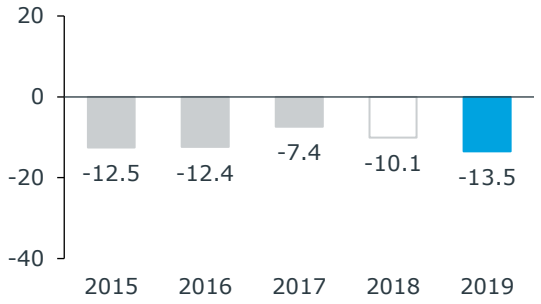
South Korea Retail Validation Study

2019 Validation Study

Validation Results

Precision	87.6%	Bias	-13.5%

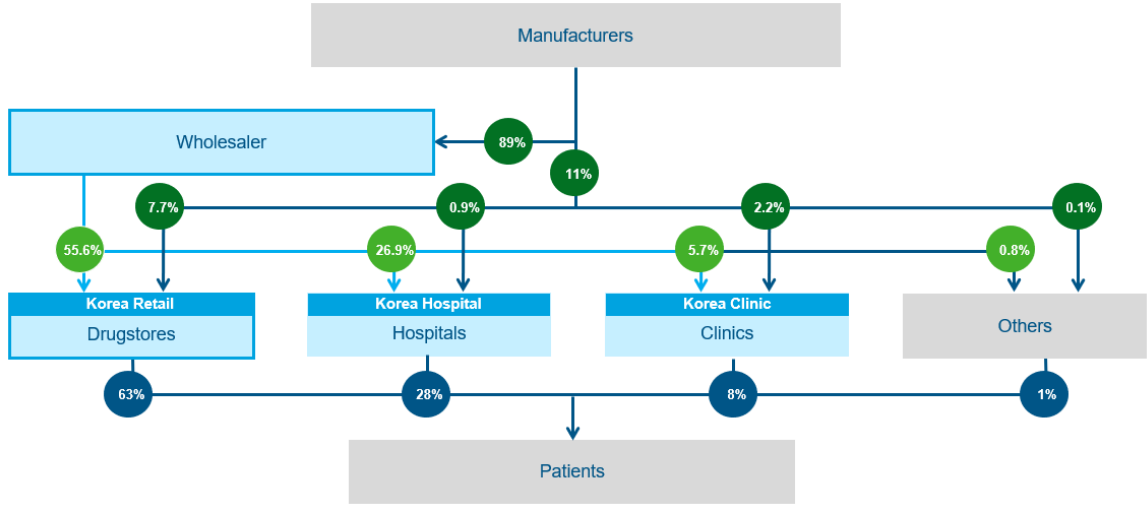




Outcomes

- Overall precision index improved by 0.7 percentage points in 2019;
- Overall underestimation increased by 3.4 percentage points in 2019;
- Review projection level and panel composition; check completeness and replace inadequate panel.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
15 *(+1 vPY)*	**743** *(+379 vPY)*	**10%** *(+2% vPY)*

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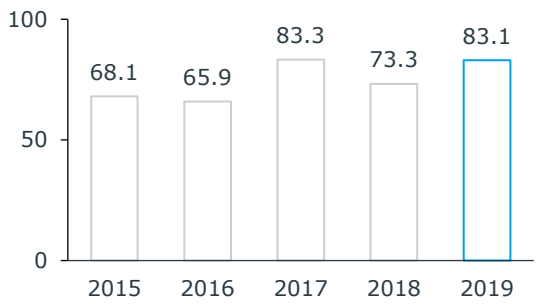
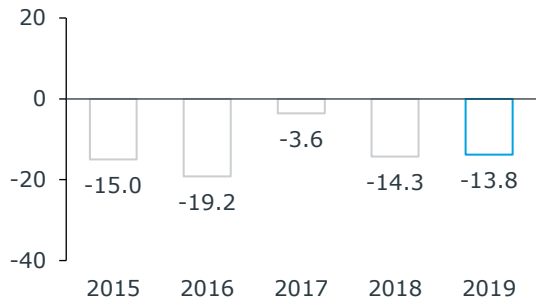
South Korea OTC Validation Study

2019 Validation Study

Validation Results

Precision	83.1%	Bias	-13.8%

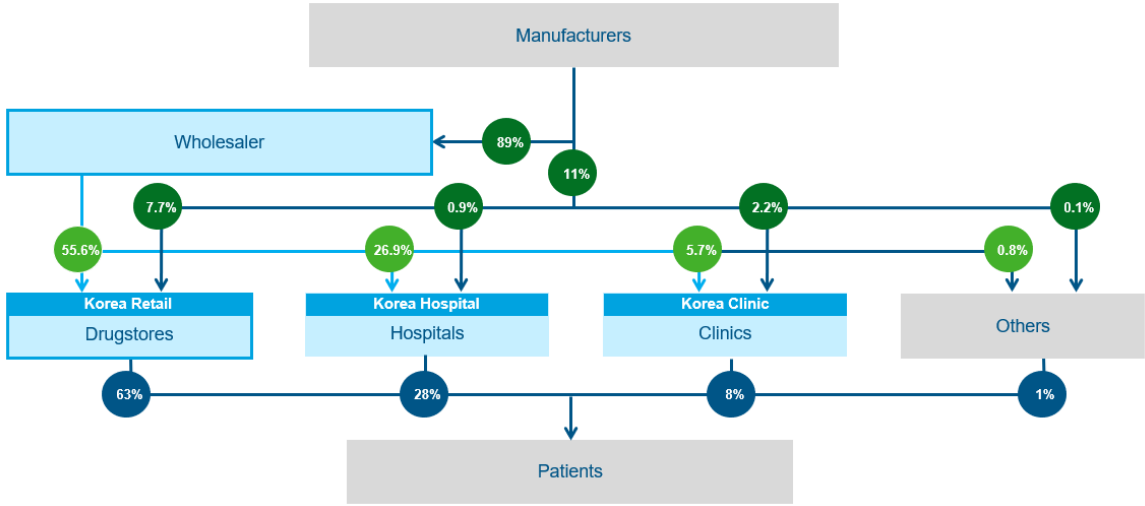




Outcomes

- Overall precision index improved by 9.8 percentage points in 2019;
- Overall underestimation improved by 0.5 percentage points in 2019;
- Review projection level and panel composition; check completeness and replace inadequate panel.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
10 *(+4 vPY)*	**135** *(+105 vPY)*	**3%** *(+2% vPY)*

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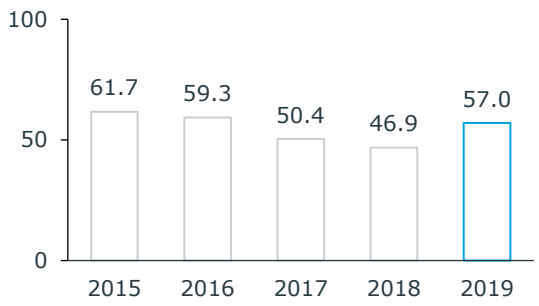
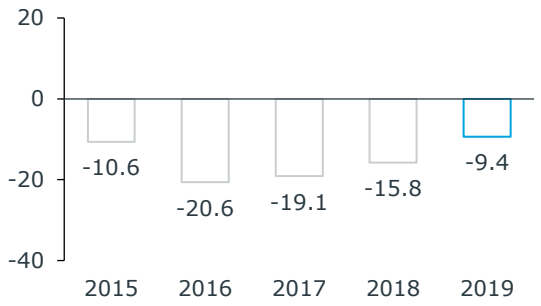
South Korea Hospital Validation Study

2019 Validation Study

Validation Results

Precision	57.0%	Bias	-9.4%

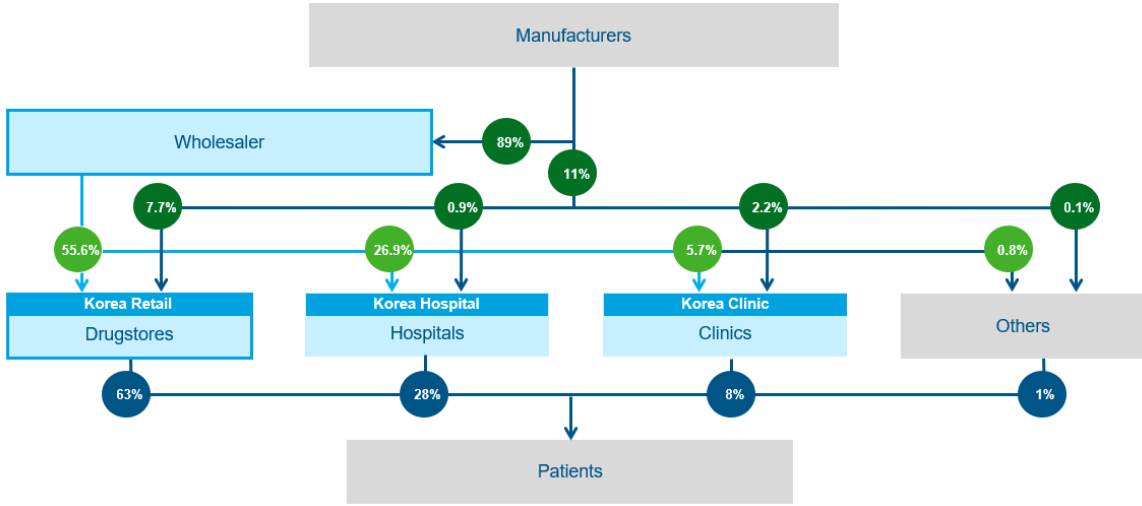




Outcomes

- Overall precision index improved by 10.1 percentage points in 2019;
- Overall underestimation improved by 6.4 percentage points in 2019;
- Review projection level and panel composition; improve QC process.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
13 *(-1 vPY)*	**153** *(+40 vPY)*	**4%** *(+3% vPY)*

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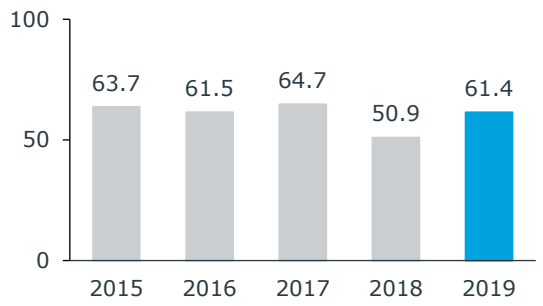
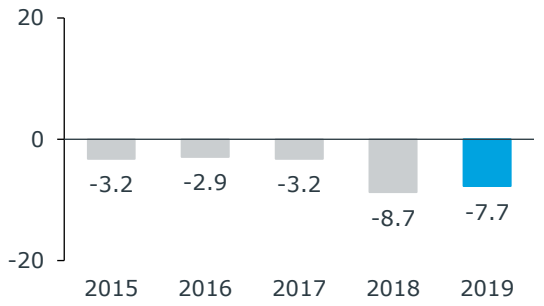
Indonesia Total Market Validation Study

2019 Validation Study

Validation Results

Precision	61.4%	Bias	-7.7%

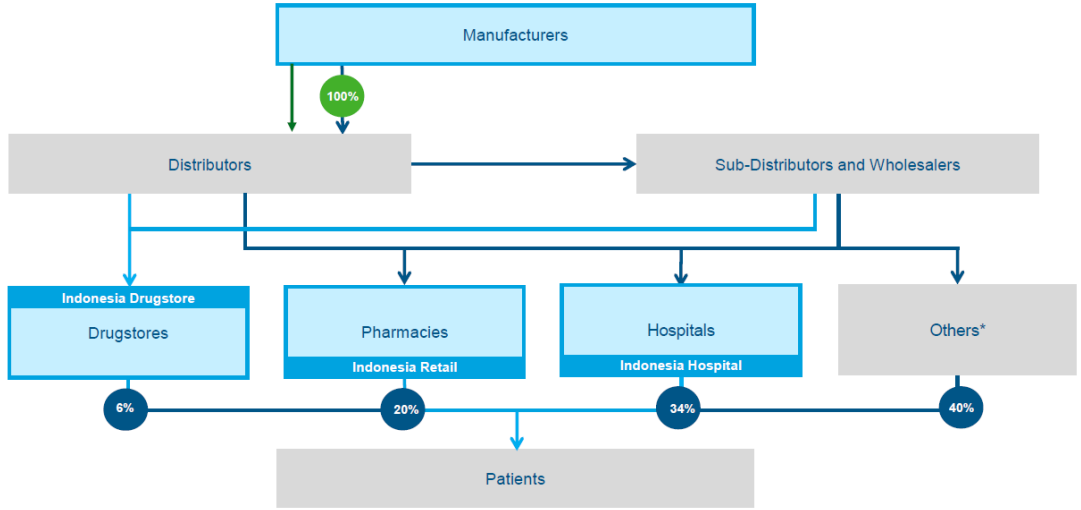




Outcomes

- Overall precision index improved by 10.5 percentage points in 2019;
- Overall underestimation improved by 1.0 percentage point in 2019;
- New data sources from chain pharmacies and Nielsen general &modern trade integrated in 2020, meanwhile, IQVIA continues to expand contributor data coverage.

Distribution Channels Validated



Validation Participation

# Participating Companies	# Forms Validated	% Market Validated
48 *(-1 vPY)*	**999** *(-184 vPY)*	**13%** *(-9% vPY)*

**% Market Validated is calculated based on units, in terms of values, up to Q320, % Market can be validated has reached at 50%.*

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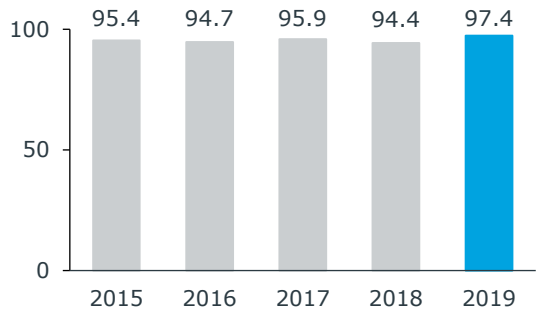
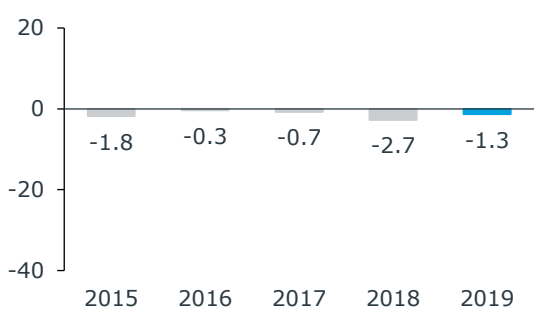
Pakistan Retail Validation Study

2019 Validation Study

Validation Results

Precision	97.4%	Bias	-1.3%

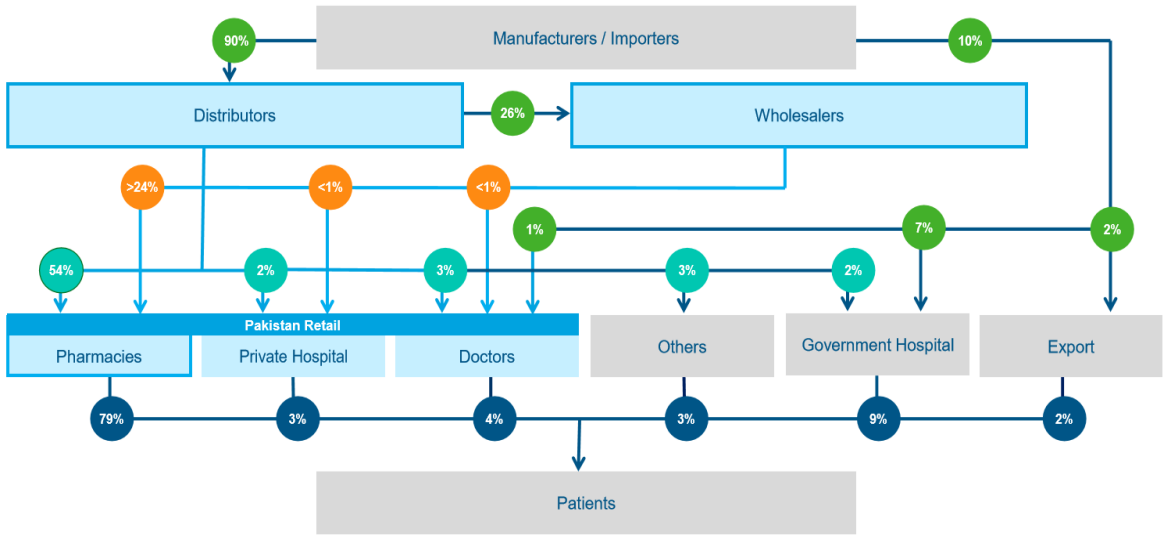




Outcomes

- Overall precision index improved by 3.0 percentage points in 2019
- Overall underestimation improved by 1.4 percentage points in 2019
- Maintain the participation level of the validation study

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
69 *(-6 vPY)*	**2,374** *(-30 vPY)*	**71%** *(+3% vPY)*

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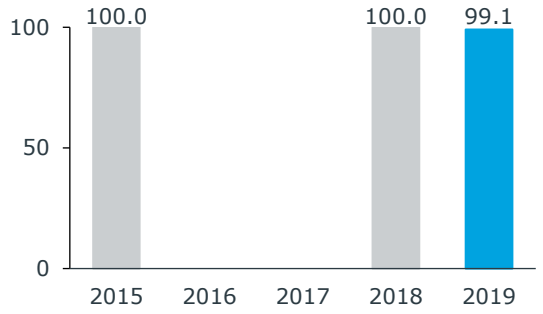
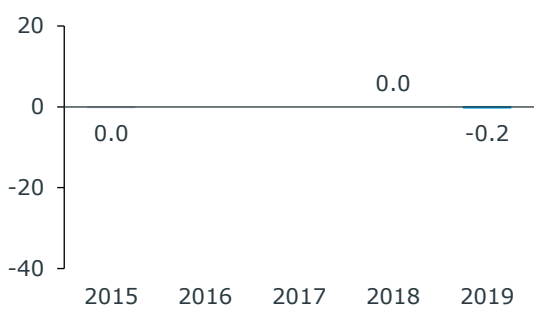
Philippines Retail Validation Study

2019 Validation Study

Validation Results

Precision	99.1%	Bias	-0.2%

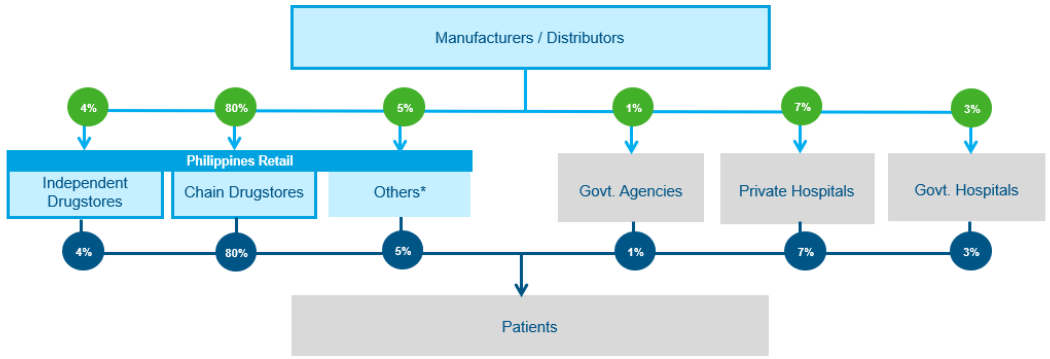




Outcomes

- Overall precision index declined slightly by 0.9 percentage points in 2019;
- Overall underestimation increased slightly by 0.2 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



*Others: DP/Industrials/Clinic w/o Beds

Participation

# Participating Companies	# Forms Validated	% Market Validated
18 *(-6 vPY)*	**635** *(-231 vPY)*	**25%** *(-6% vPY)*

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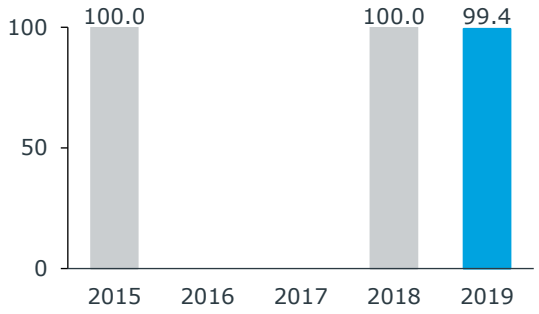
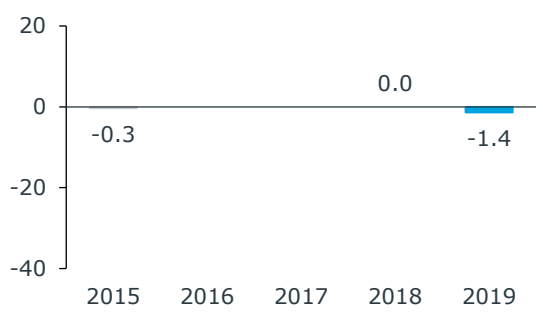
Philippines Hospital Validation Study

2019 Validation Study

Validation Results

Precision	99.4%	Bias	-1.4%

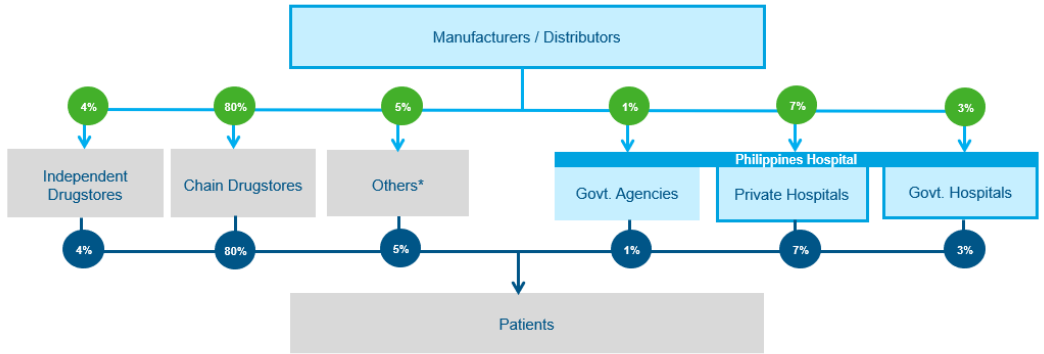




Outcomes

- Overall precision index declined slightly by 0.6 percentage points in 2019;
- Overall underestimation increased by 1.4 percentage points in 2019;
- No action required from the statistical point of view.

Distribution Channels Validated



*Others: DP/Industrials/Clinic w/o Beds

Participation

# Participating Companies	# Forms Validated	% Market Validated
14 *(-6 vPY)*	**230** *(-52 vPY)*	**18%** *(-2% vPY)*

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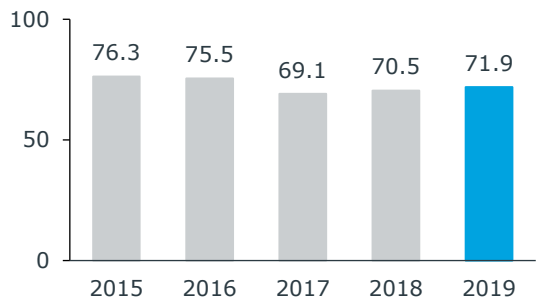
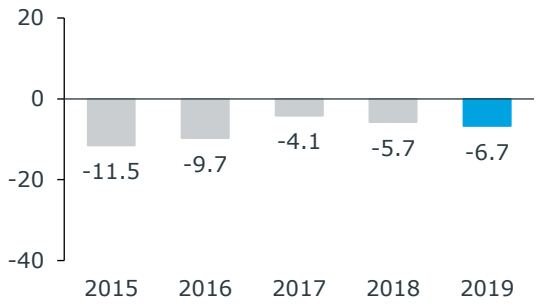
Singapore Retail Validation Study

2019 Validation Study

Validation Results

Precision	71.9%	Bias	-6.7%

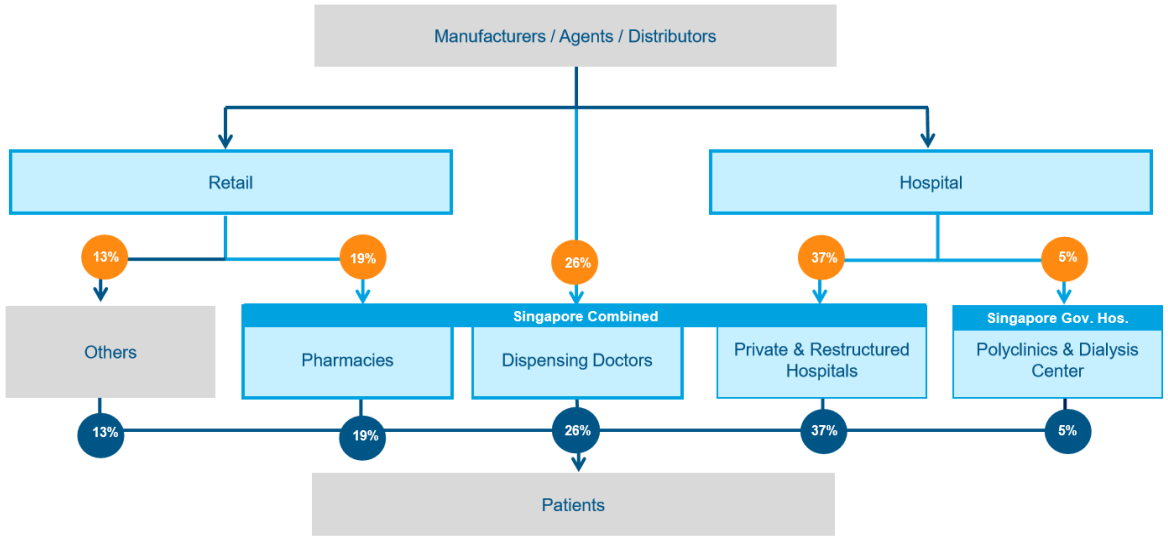




Outcomes

- Overall precision index improved by 1.4 percentage points in 2019
- Overall underestimation increased by 1.0 percentage point in 2019
- Continue to secure additional direct data and panels to improve further

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
75 *(+4 vPY)*	**1,116** *(-26 vPY)*	**35%** *(no change vPY)*

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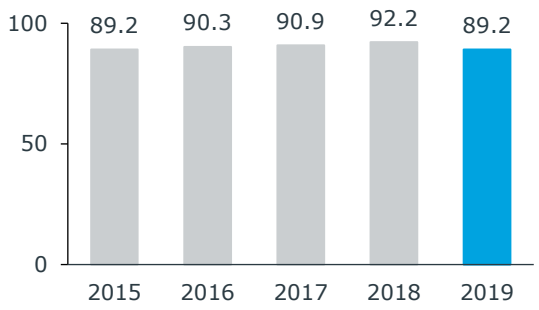
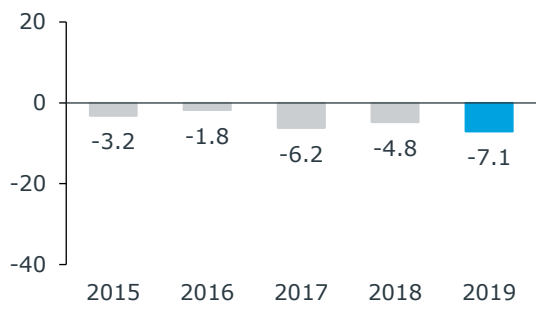
Thailand Retail Validation Study

2019 Validation Study

Validation Results

Precision	89.2%	Bias	-7.1%



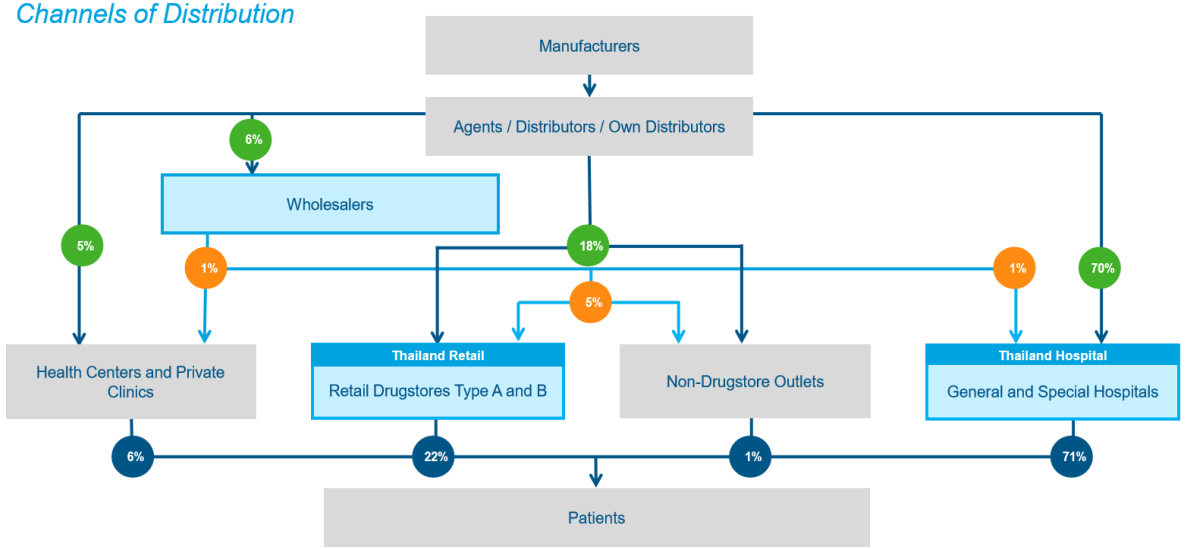


Outcomes

- Overall precision index declined by 3 percentage points in 2019
- Overall underestimation increased by 2.3 percentage points in 2019
- Enhance projection methodology; Onboard new chain and independent panels.

Distribution Channels Validated

Channels of Distribution



Participation

# Participating Companies	# Forms Validated	% Market Validated
48 *(+3 vPY)*	**1,222** *(+48 vPY)*	**32%** *(no change)*

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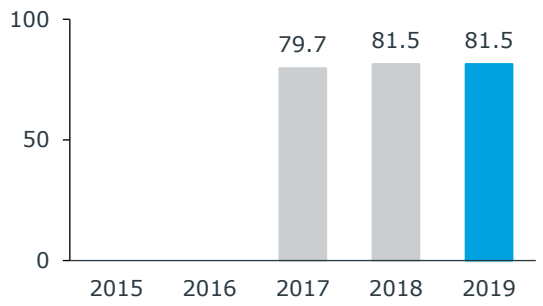
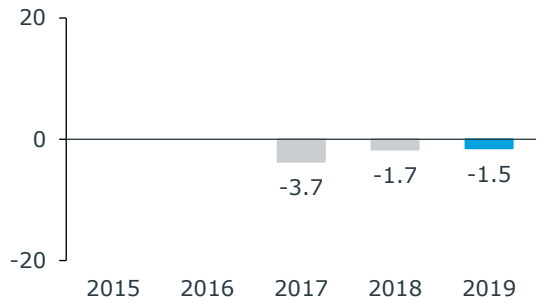
Vietnam Total Market Validation Study

2019 Validation Study

Validation Results

Precision	81.5%	Bias	-1.5%

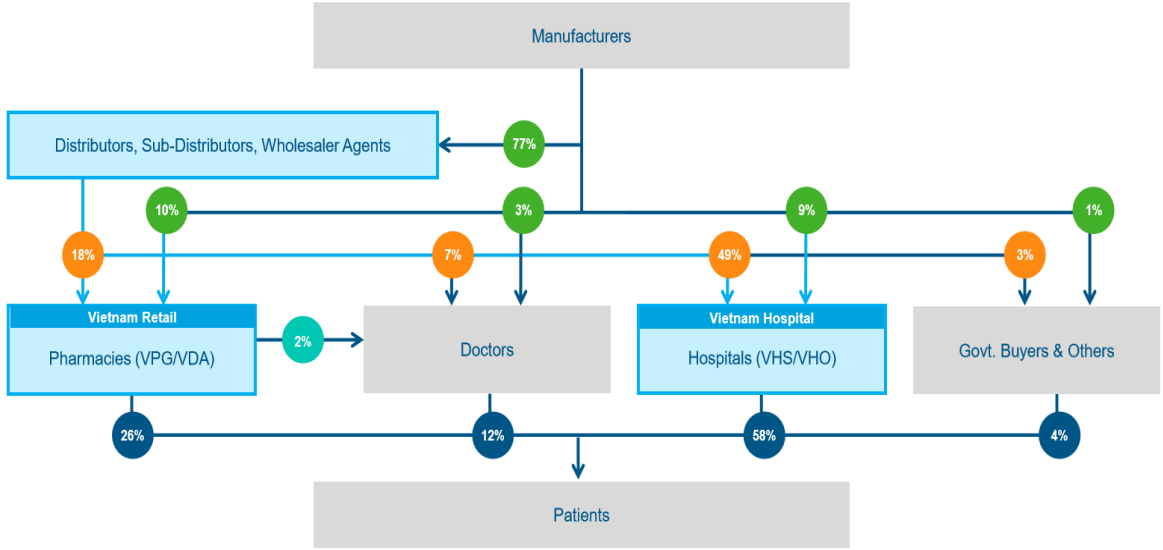




Outcomes

- Overall precision index kept unchanged at 81.5% in 2019;
- Overall underestimation improved by 0.2 percentage points in 2019;
- Add channel level granularity; Expand coverage of benchmark.

Distribution Channels Validated



Participation

# Participating Companies	# Forms Validated	% Market Validated
88 *(-8 vPY)*	**1,523** *(+2 vPY)*	**27%** *(+0% vPY)*

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Methodology

Content covered in this section

Validation Studies 1

- Distribution Channels validated
- Decile Inclusion/Exclusion Schema
- How IQVIA measures Accuracy

Accuracy 2

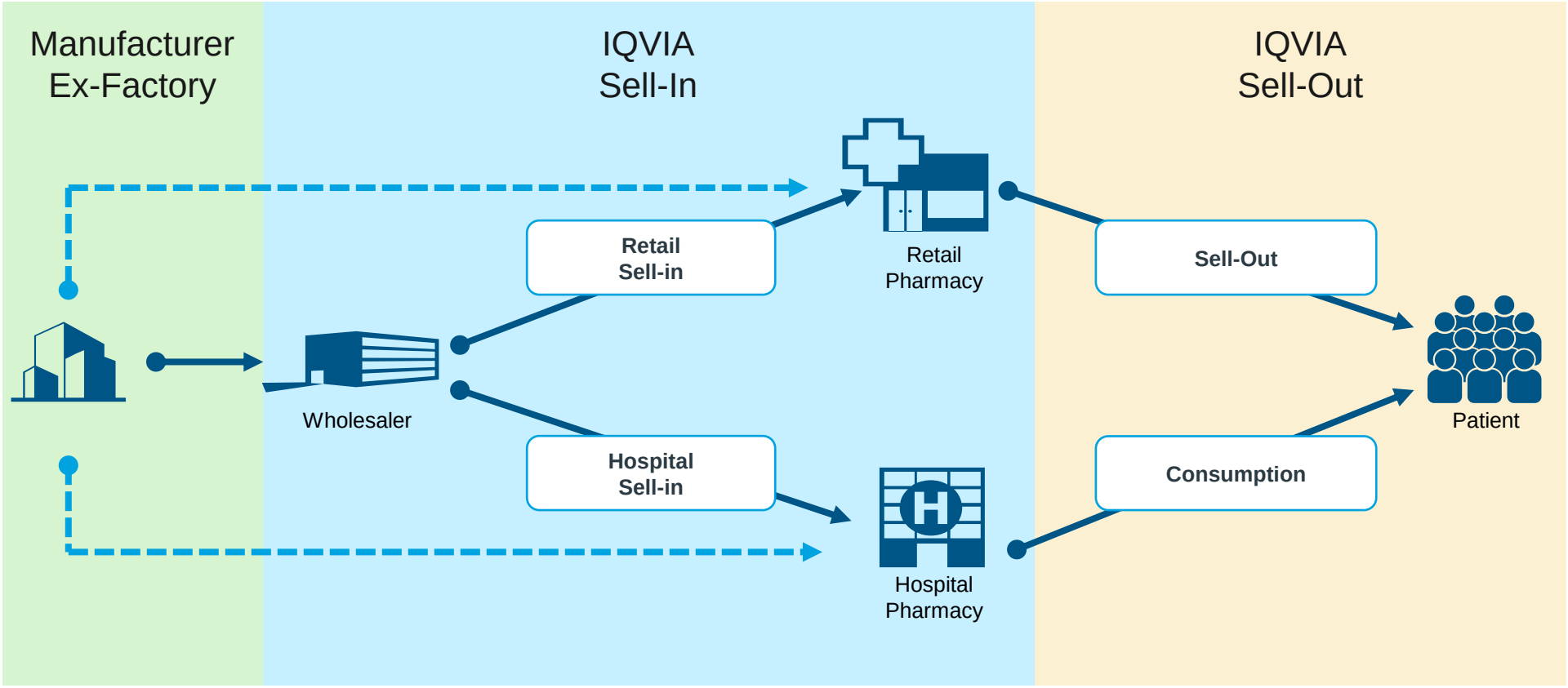
- Bias (interpretation – calculus – limitations)
- Overestimation (illustration)
- Underestimation (illustration)
- Precision (interpretation – calculus – illustration)

Timeliness 3

- Elapsed days after reporting period (definition)
- On-target % (definition)
- 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	Medium 30% Included
4	206	2,782,743	421,471,438	
5	118	4,572,060	421,329,006	
6	66	9,143,464	427,161,847	Large 50% included
7	36	15,617,602	424,827,107	
8	20	34,458,310	444,648,076	
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	Low 5% excluded
1.02	1,386	44,263	42,143,302	
1.03	771	67,192	42,167,630	
1.04	530	93,364	42,200,606	
1.05	390	122,163	42,163,778	
1.06	313	148,246	42,209,105	Next 5% included
1.07	258	181,048	42,244,392	
1.08	215	214,823	42,284,130	
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 %

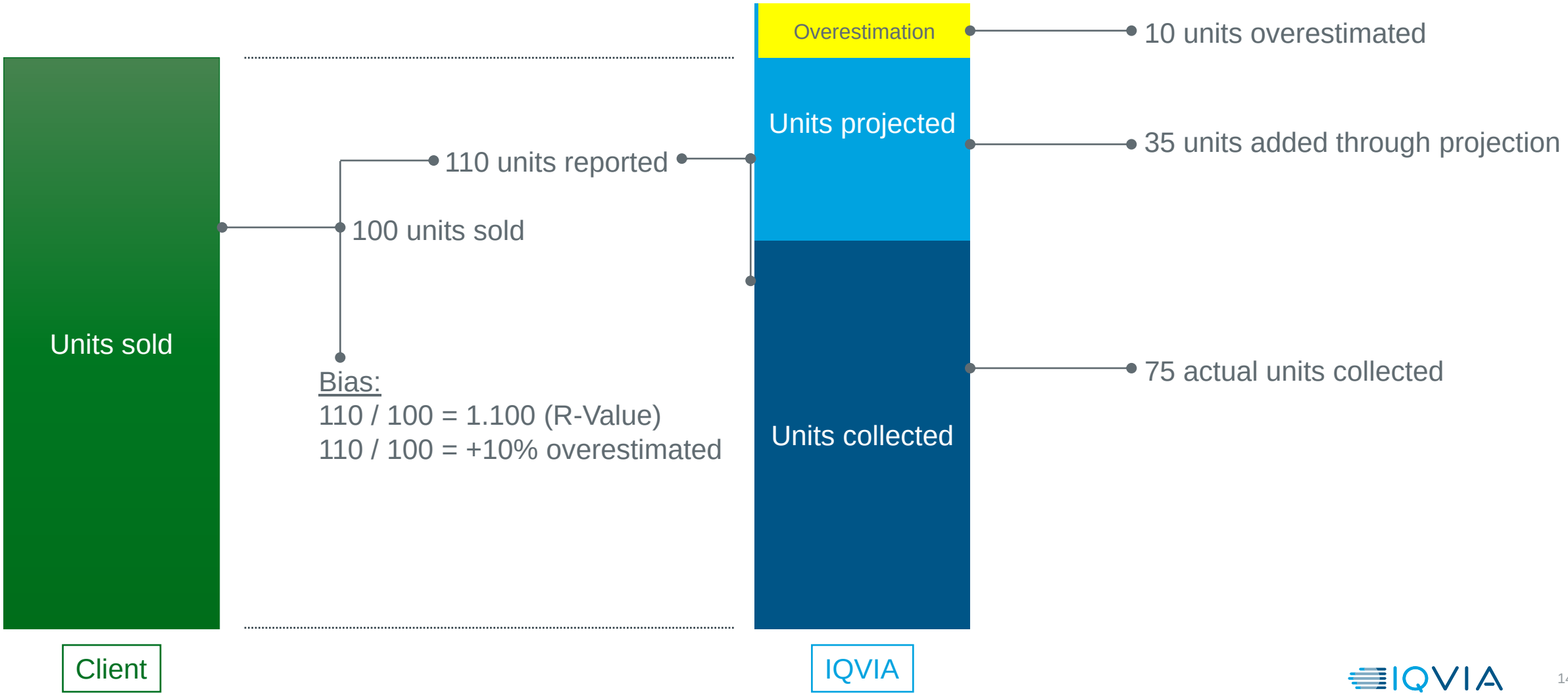
$$= \left(\frac{\textbf{Total Audit units } of \text{ all validated product forms}}{\textbf{Total REAL units } of \text{ all validated product forms}} \text{ -1 } \right) * 100$$

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.

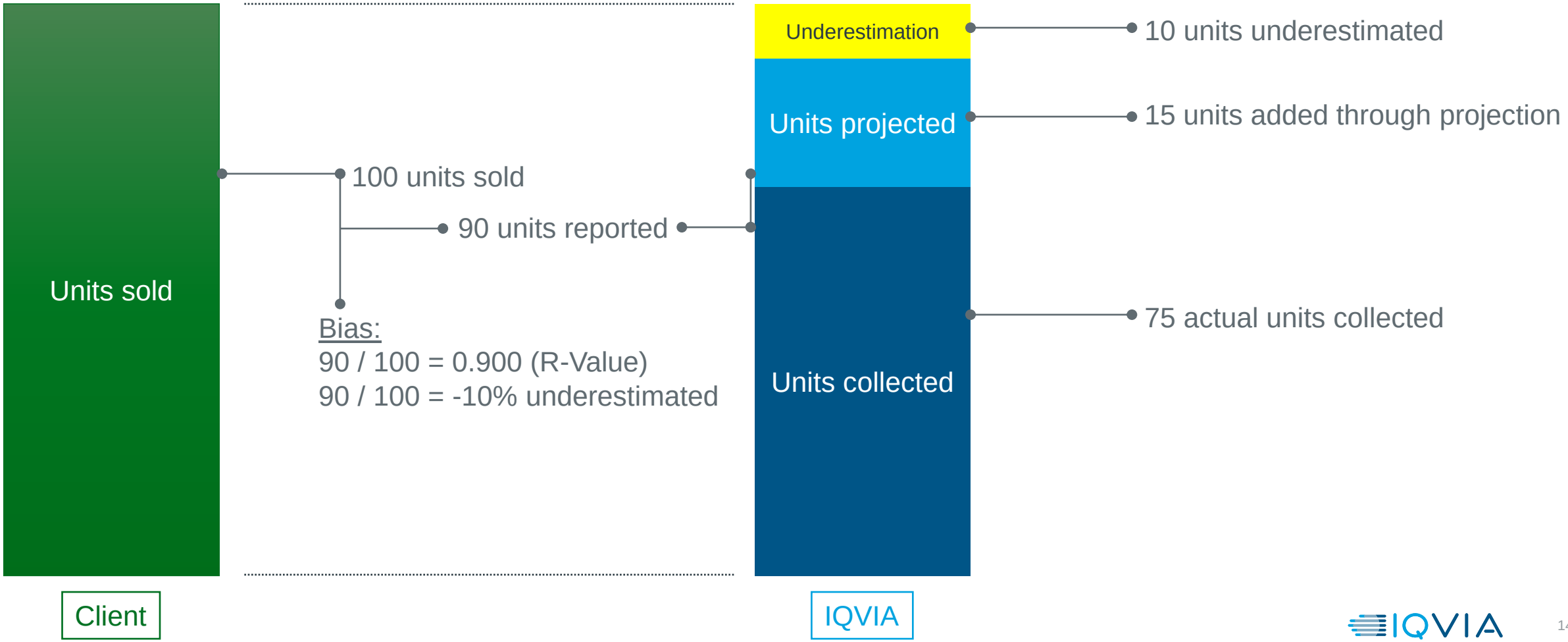
Clients Ex-Factory data vs. IQVIA's audited channel data

Example 1: Overestimation



Clients Ex-Factory data vs. IQVIA's audited channel data

Example 2: Underestimation



Validation Metrics

Precision: % of products in a fixed range of deviation

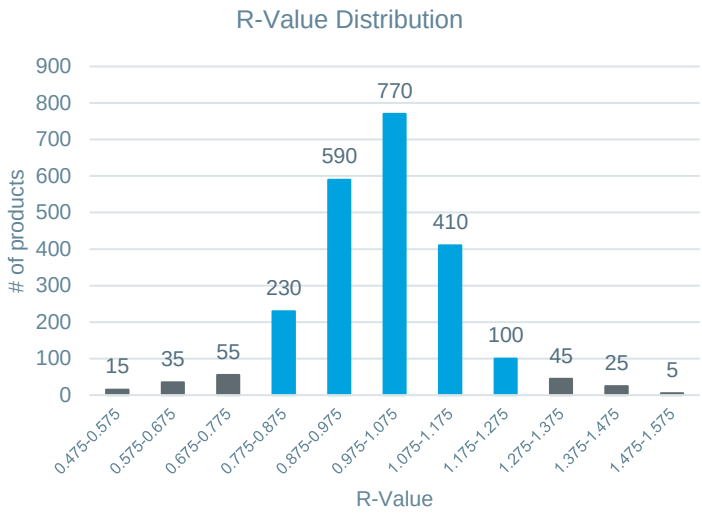
Interpretation

- 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



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

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 were 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

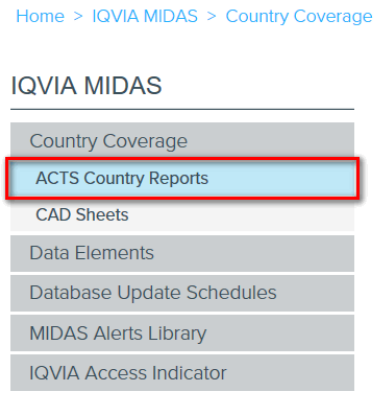
DAP data being used is also published on MIDAS Delivery Performance: https://customerportal.imshealth.com/sites/imsportal/product-support/midas-products-psa/iqvia-midas/psa/database-update-schedules

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

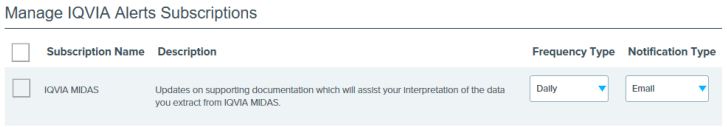
Algeria	Estonia	Mexico	Switzerland
Argentina	Finland	Morocco	Thailand
Austria	France	Pakistan	Tunisia
Bangladesh	Germany	Peru	Turkey
Bosnia	Greece	Philippines	UAE
Brazil	Hong Kong	Poland	UK
Bulgaria	Hungary	Portugal	Uruguay
Canada	Indonesia	Russia	USA
Cen. America	Italy	Saudi Arabia	Venezuela
Chile	Japan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

Alerts Subscriptions

If you would like to get notified about new ACTS content added to the portal, please enable alert notifications under My Settings > Manage IQVIA Alerts Subscriptions. Please select following subscription name:

- "IQVIA MIDAS"

and your individual frequency and notification type:



2020 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)