# acts 2018

## IQVIA Quality Assurance

# Contents

# Abstract

**Dear Client:**

The 32nd edition of ACTS, our annual report on IQVIA quality assurance, serves as a regular update on the accuracy of our data and delivery speed for our reports and services. It is an IQVIA tradition to provide our customers with this important publication, demonstrating our strong commitment to quality, defined as *accurate information* provided *at the right time*.

To produce the ACTS report every year, the IQVIA Data Science & Advanced Analytics Department works with more than 3,000 affiliates of pharmaceutical companies. For the 2017 data deliveries, we compared our data estimates to the industry's sales numbers for close to 90,000 product forms and calculate precision values as key performance indicators in each country. Any decline in data accuracy triggers an immediate reaction from the data science team to identify root causes and corrective solutions. In this way we can keep up to date with market changes and maintain the quality of our statistical sample.

Because getting the right data at the right time is a common requirement for our clients, we also monitor a second parameter of quality: Timeliness. Every year, we calculate the average delivery time and our compliance with internally defined delivery targets for more than 30,000 client deliveries made in five years. For 2017, we have achieved a highly stable result of close to 95 percent precision paired with an average delivery time of less than 22 days.

I would like to thank you for your continuous interest in IQVIA's global quality results and for your collaboration in making this report possible. We are, of course, available to answer any questions you might have. Please feel free to get back to us.

Yours sincerely,

Yilian Yuan, Ph.D. MBA

Senior Vice President

IQVIA Data Science
& Advanced Analytics

# Accuracy

The IQVIA validation studies, with their global reach and standardized measures, provide pharmaceutical companies with an impartial and forthright reference with which to judge the quality of IQVIA data.

By thus reporting on the precision of IQVIA's decision-support tools, validation studies facilitate pharmaceutical companies' international decision making.

## The Validation Process

IQVIA conducts its validation studies in close co-operation with our service subscribers. Once we complete our year-end pharmacy audit, we supply our subscribers with software that presents our estimated yearly sales volume for each product pack. Subscribers then enter their *actual* sales volume based on what they supplied to retail pharmacies.

We then calculate an "R-Value" representing the ratio of *estimated* sales as projected by IQVIA to *actual* sales as reported by our industry partners. For each product examined, we calculate an individual R-Value. We also calculate an average R-Value across all validated product forms.

R-Values indicate the scale of overestimation or underestimation in IQVIA results. An R-Value of 1.0 is the ideal and would mean that our projection matched reality exactly. Due to the nature of statistical sampling, R-Values typically deviate from 1.0, and it is only practical to strive for individual R-Values that are clustered tightly around this theoretical ideal.

We express audit precision as the percentage of all *individual* R-Values that fall within a predefined range of deviation around the *average* R-Value. The standard precision range is ±22.5 percentage points around the average over/underestimation. The greater the data precision, the more tightly R-Values will be located in the centre of this range.

A precision value of 90 percent, paired with a zero percent bias, can be interpreted as follows: On average, IQVIA audit data reflect a high degree of homogeneity since 90 percent of the validated product forms lie between –22.5 percent and +22.5 percent of the reported industry numbers.

Conceptually, comparing IQVIA audit estimates with manufacturer sales data requires that the numbers be fully compatible. This compatibility hinges on the ability of companies participating in the validation study to segregate their internal sales data, isolating those sales channeled to the pharmacy retailing sector. The degree to which they can do this correlates closely with the technical infrastructure of the country and the complexity of the distribution system. When sales to other market sectors (e.g., tenders, exports) are not segregated and instead are included in a company's sales, the assumption is that IQVIA data have underestimated reality, and consequently they are viewed as incorrect.

Parallel trade practices add another element of incompatibility to the data. Typically, manufacturers are unaware of the sales volume that sub-distributors and pharmacies *export to* other countries (parallel exports) or *import* from other countries (parallel imports). In parallel *export* situations, the *industry* numbers are usually inflated by sales that never entered the domestic pharmacy market.

Conversely, in parallel *import* situations in which the imported items are not isolated, for example through official parallel traders, *IQVIA* numbers are usually inflated. IQVIA excludes products that are typically traded to secure the relevance of the validation results.

Validation study results are considered to be representative of the survey universe if more than 20 percent of the market is reflected in what our data partners send us. If the total market coverage reported by our data partners falls between 10 and 20 percent, validation results may still give a good indication of change from one year to the next, but otherwise must be used with care. Studies with participation rates less than 10 percent are included in the ACTS report but marked as *not representative* by means of an uncolored bar.

## The 2017 Validation Results

The validation process usually starts 2-3 months after the close of the year being validated. Typically, it can take up to ten months after we receive final feedback and can complete the analysis of any given country. For the 2017 validation studies, we analyzed a total of 85,155 product forms from 3,316 company affiliates in 76 retail, hospital and PharmaTrend reports. OTC analyses were not counted as these are subsets of the corresponding retail or PharmaTrend reports. In 2017, 44 company affiliates world-wide participated in a validation study on average by country and report.
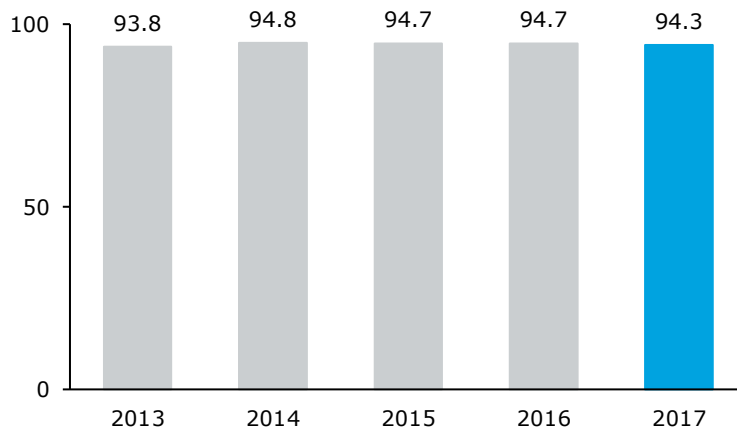
### Global Validation Results

Until a couple of years ago, we only validated IQVIA retail audits while hospital, OTC and PharmaTrend offerings were quality-assessed more on a sporadic basis. Along with an upgrading of the ACTS validation process, we also incorporated these other standard deliverables in ACTS and have provided you lately with individual validation results. One request from our readers' community was to summarize all individual validation results to one single metric – the *Global Precision Index*.

This is an aggregate of all validations performed with uninterrupted 5-years data and serves as a high level indicator on IQVIA data accuracy.

For 2017, this global index utilized the outcome from 90 validation studies and demonstrated a high degree of stability across the 5-year time period. Lately, a marginal overall decline of 0.4 percentage points was stated, from 94.7% in 2016 to 94.3% in 2017.

## Global Precision Index (%)

| 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|
| 93.8 | 94.8 | 94.7 | 94.7 | 94.3 |

## Retail Validation Results

For the 2017 validation studies, 56 countries provided analysable results. No validation study was necessary in Denmark, Finland, Norway and Sweden because we collect full census data in these countries. There, precision results are assumed to be 100 percent. This makes a total of 60 sets of validation results, of which 55 have uninterrupted five-year results. The overall degree of precision in IQVIA retail pharmaceutical reports is best described by an aggregated precision index for these 55 countries:

## Retail Precision Index (%)

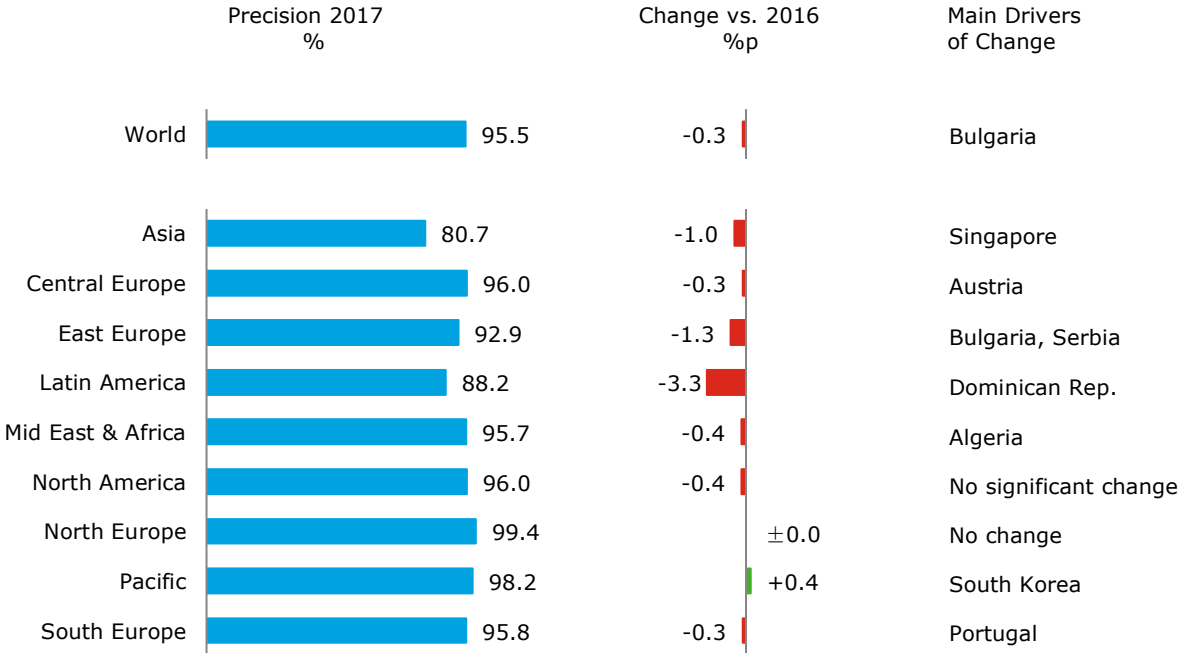| 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|
| 94.5 | 95.9 | 95.6 | 95.8 | 95.5 |
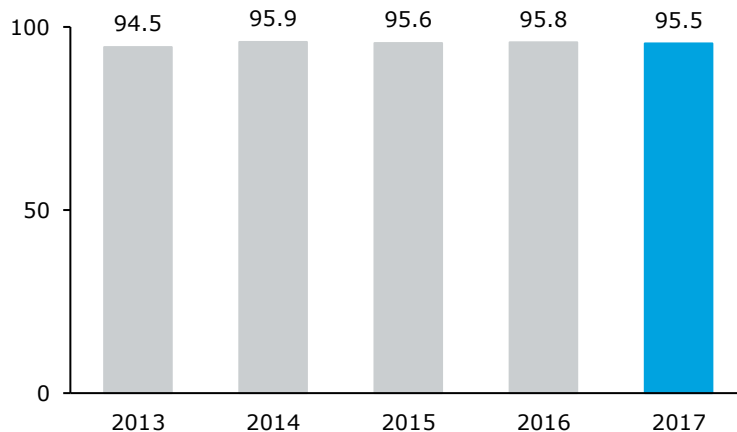
Overall, the retail precision index over the 5-year period documents solid outcome in maintaining existing levels of data quality well above 94%. In 2017, the index declined slightly by 0.3 percentage points over 2016 to 95.5% on average.

## Regional Retail Validation Results

Two of the nine regions managed to improve or maintain their 2016 result also in 2017. *North Europe* achieved the highest precision score with 99.4%, followed by *Pacific* at 98.2% and *Central Europe* and *North America* at 96.0%. The highest precision gain of 0.4 percentage points was reported for *Pacific*. Seven regions declined over 2016, most significantly *Latin America* by 3.3 percentage points to 88.2%. All regions in detail and their main contributors to changes are listed below:

| | Precision 2017 % | Change vs. 2016 %p | Main Drivers of Change |
|---|---|---|---|
| World | 95.5 | -0.3 | Bulgaria |
| Asia | 80.7 | -1.0 | Singapore |
| Central Europe | 96.0 | -0.3 | Austria |
| East Europe | 92.9 | -1.3 | Bulgaria, Serbia |
| Latin America | 88.2 | -3.3 | Dominican Rep. |
| Mid East & Africa | 95.7 | -0.4 | Algeria |
| North America | 96.0 | -0.4 | No significant change |
| North Europe | 99.4 | ±0.0 | No change |
| Pacific | 98.2 | +0.4 | South Korea |
| South Europe | 95.8 | -0.3 | Portugal |

## Improvement & Deterioration by Country

More details on the markets with an improved or declined precision value are given in the table on the subsequent page.

| | Improvement | | | | Deterioration | |
|---|---|---|---|---|---|---|
| Country | Precision 2017 % | Change vs. 2016 %p | | Country | Precision 2017 % | Change vs. 2016 %p |
| Bolivia | 53.6 | +4.1 | | Algeria | 74.0 | -4.2 |
| Canada | 100.0 | +3.3 | | Bulgaria | 89.5 | -6.6 |
| Estonia | 87.4 | +2.7 | | Central America | 84.5 | -5.0 |
| Latvia | 89.5 | +4.3 | | Colombia | 80.8 | -4.3 |
| Morocco | 93.5 | +6.4 | | Dominican Rep. | 80.7 | -11.0 |
| Peru | 91.8 | +3.4 | | Hong Kong | 75.4 | -4.2 |
| Uruguay | 86.7 | +2.9 | | Mexico | 85.2 | -5.1 |
| | | | | Portugal | 93.9 | -4.4 |
| | | | | Singapore | 69.1 | -6.4 |

Seven countries turned out with significant improvement of more than 2 percentage points over 2016. Remarkable precision gain of 6.4 percentage points was noted for *Morocco*, followed by *Latvia* (4.3), *Bolivia* (4.1) and *Peru* with a 3.4 percentage point improvement. Opposed to this pleasant achievement, nine countries showed accentuated decline of more than 4 percentage points over 2016, with *Dominican Republic* facing the biggest precision loss of 11.0 percentage points, followed by *Bulgaria* (-6.6) and *Singapore* (-6.4). All nine countries are in the focus of our quality-improving initiatives in 2018/2019.

## Country-specific Results

The validation studies mentioned on the subsequent country pages refer to the IQVIA retail reports, with the following exceptions:

| Country | Market covered |
|---|---|
| Bosnia & Herzegovina, Croatia, Czech Republic, Hungary, Japan, Kazakhstan, Poland, Russia, Serbia, Slovak Republic, Slovenia, Switzerland, USA | Retail+hospital market |
| Hong Kong, Vietnam | Total market |
| Malaysia, Singapore | Total private market |

Further parts of this accuracy section, which follow the retail validation pages, highlight other validation initiatives of high interest to our data subscribers:

- OTC validation studies
- PharmaTrend validation studies
- Hospital validation studies
- Specialty markets validation results
- Validating our forecasting services

In addition, we are providing updates on the latest measures we've taken to sustain today's quality levels:

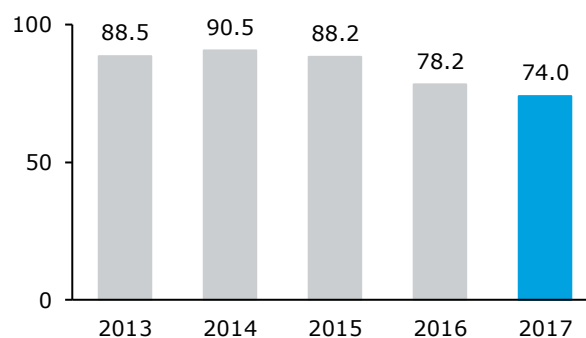- Universe updates
- Data capture

# Algeria

## Precision (%)

Overall precision index declined by 4.2 percentage points in 2017

Large product forms reached 82.6%, medium 66.7% and small 60.2%

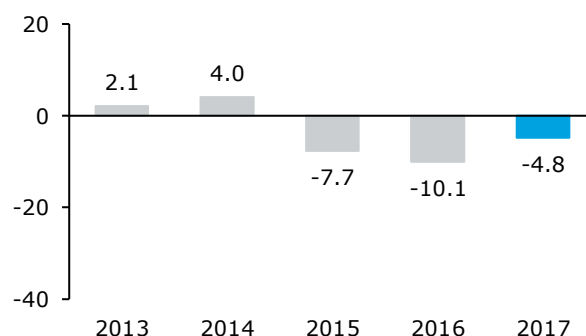Forms validated in both years, 2016 and 2017, declined by 5.5 percentage points to 74.3% in 2017

Precision (%) chart:
| Year | Value |
|------|-------|
| 2013 | 88.5 |
| 2014 | 90.5 |
| 2015 | 88.2 |
| 2016 | 78.2 |
| 2017 | 74.0 |

## Over/Underestimation (%)

Overall underestimation improved by 5.3 percentage points in 2017

Large product forms were underestimated by 3.6%, medium by 6.7% and small by 6.0%

Underestimation of forms validated in both years, 2016 and 2017, improved by 3.1 percentage points to 5.4% in 2017

Over/Underestimation (%) chart:
| Year | Value |
|------|-------|
| 2013 | 2.1 |
| 2014 | 4.0 |
| 2015 | -7.7 |
| 2016 | -10.1 |
| 2017 | -4.8 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 12 | 16 | 23 | 23 | **30** |
| Validated market share in unit terms | 26% | 28% | 33% | 41% | **47%** |
| Validated product forms | 238 | 303 | 367 | 443 | **544** |

## Actions

Evaluate panel representativeness

Adjust projection level

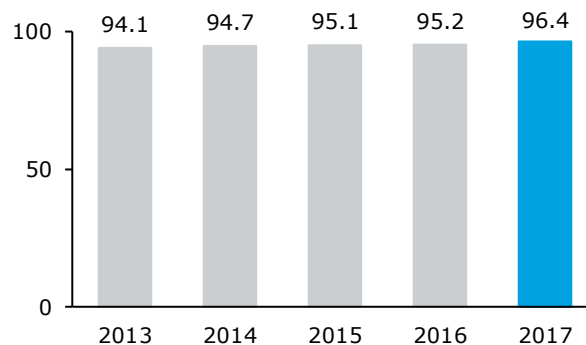# Argentina

## Precision (%)

Overall precision index improved by 1.2 percentage points in 2017

Large product forms reached 98.4%, medium 94.5% and small 93.7%

Forms validated in both years, 2016 and 2017, declined by 1.1 percentage points to 96.8% in 2017
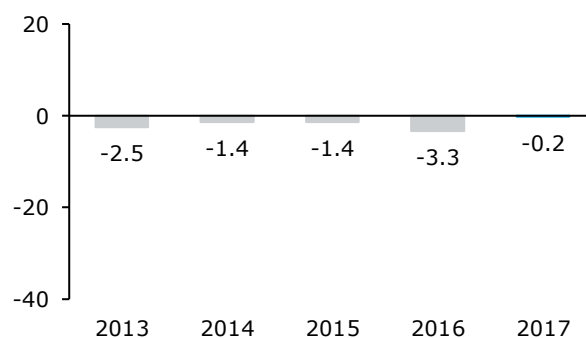


| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 94.1 | 94.7 | 95.1 | 95.2 | 96.4 |

## Over/Underestimation (%)

Overall underestimation improved by 3.1 percentage points in 2017

Large product forms were overestimated by 0.2%, medium were underestimated by 0.4%, and small by 1.3%

Underestimation of forms validated in both years, 2016 and 2017, improved by 1.0 percentage point to 0.4% in 2017



| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -2.5 | -1.4 | -1.4 | -3.3 | -0.2 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 65 | 64 | 35 | 48 | **40** |
| Validated market share in unit terms | 57% | 62% | 42% | 48% | **48%** |
| Validated product forms | 2,863 | 3,140 | 2,088 | 2,348 | **2,202** |

## Actions

No action required from the statistical point of view

# Austria
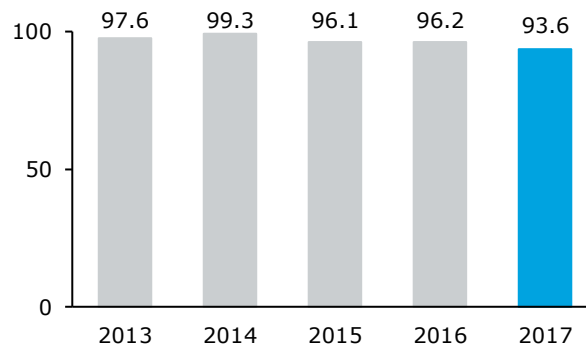
## Precision (%)

Overall precision index declined by 2.6 percentage points in 2017

Large product forms reached 95.5%, medium 92.1% and small 90.0%

Forms validated in both years, 2016 and 2017, improved by 1.2 percentage points to 96.9% in 2017
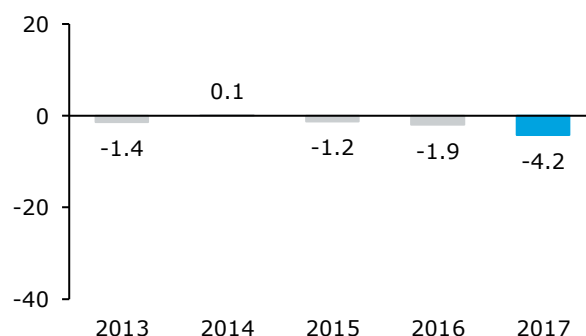


## Over/Underestimation (%)

Overall underestimation increased by 2.3 percentage points in 2017

Large product forms were underestimated by 3.3%, medium by 6.0%, and small by 5.8%

Underestimation of forms validated in both years, 2016 and 2017, increased by 1.0 percentage point to 3.8% in 2017



## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 14 | 13 | 18 | 20 | **12** |
| Validated market share in unit terms | 30% | 23% | 33% | 30% | **12%** |
| Validated product forms | 802 | 670 | 976 | 881 | **404** |

## Actions

Motivate more clients to participate in the validation study

# Bangladesh
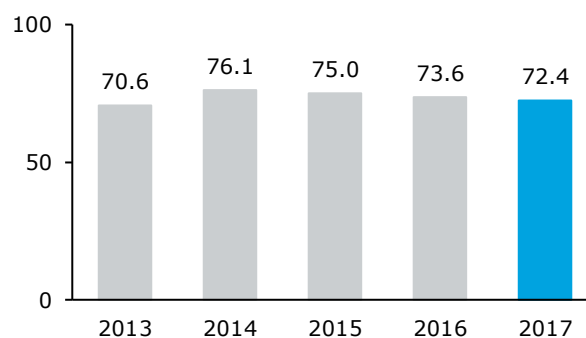
## Precision (%)

Overall precision index declined by 1.2 percentage points in 2017

Large product forms reached 86.9%, medium 62.2% and small 44.6%

Forms validated in both years, 2016 and 2017, improved by 2.1 percentage points to 75.1% in 2017

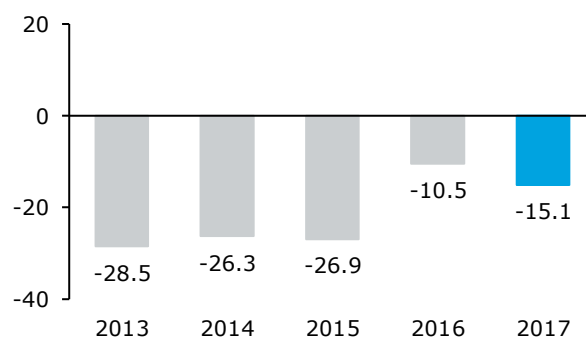| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 70.6 | 76.1 | 75.0 | 73.6 | 72.4 |

## Over/Underestimation (%)

Overall underestimation increased by 4.6 percentage points in 2017

Large product forms were underestimated by 15.9%, medium by 13.7%, and small by 15.3%

Underestimation of forms validated in both years, 2016 and 2017, increased by 4.4 percentage points to 13.9% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -28.5 | -26.3 | -26.9 | -10.5 | -15.1 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 10 | 16 | 14 | 10 | **12** |
| Validated market share in unit terms | 40% | 56% | 47% | 41% | **50%** |
| Validated product forms | 1,599 | 2,147 | 1,905 | 1,706 | **2,202** |

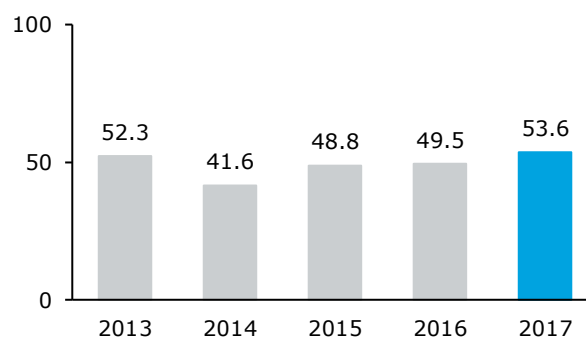## Actions

No action required from the statistical point of view

# Bolivia

## Precision (%)

Overall precision index improved by 4.1 percentage points in 2017

Large product forms reached 59.6%, medium 52.2% and small 36.2%

Forms validated in both years, 2016 and 2017, declined slightly by 0.6 percentage points to 56.3% in 2017

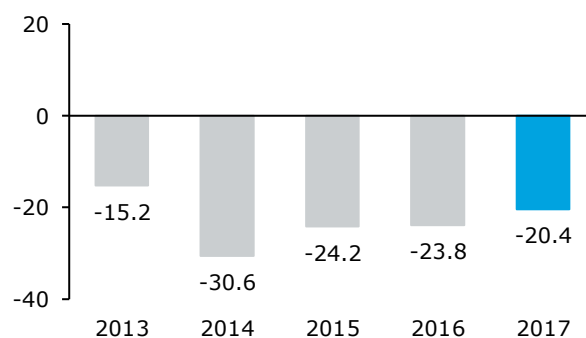| Year | Value |
|------|-------|
| 2013 | 52.3 |
| 2014 | 41.6 |
| 2015 | 48.8 |
| 2016 | 49.5 |
| 2017 | 53.6 |

## Over/Underestimation (%)

Overall underestimation improved by 3.4 percentage points in 2017

Large product forms were underestimated by 21.3%, medium by 19.5%, and small by 17.3%

Underestimation of forms validated in both years, 2016 and 2017, increased by 1.7 percentage points to 19.0% in 2017

| Year | Value |
|------|-------|
| 2013 | -15.2 |
| 2014 | -30.6 |
| 2015 | -24.2 |
| 2016 | -23.8 |
| 2017 | -20.4 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 35 | 58 | 37 | 34 | **30** |
| Validated market share in unit terms | 51% | 66% | 57% | 51% | **47%** |
| Validated product forms | 1,214 | 1,796 | 1,714 | 1,455 | **1,319** |

## Actions
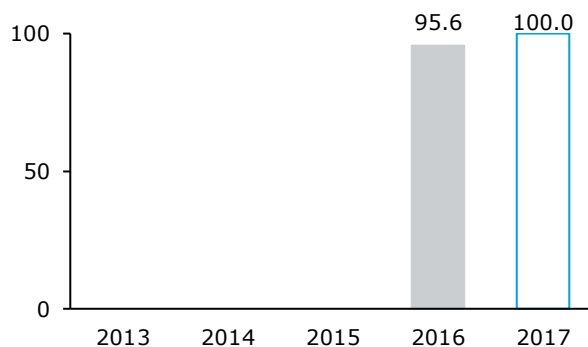
Update universe and projection level

# Bosnia and Herzegovina

## Retail+Hospital Validation Study

## Precision (%)

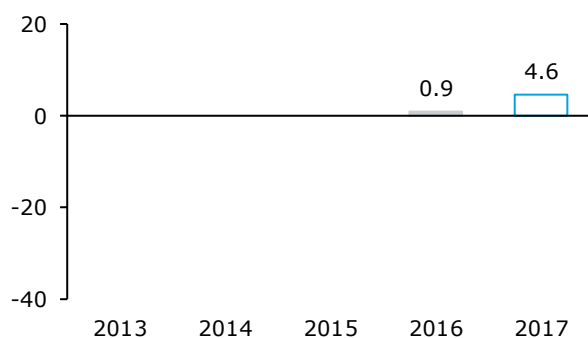Overall precision index improved by 4.4 percentage points in 2017

Due to low participation, a reasonable breakdown into sales volume groups was not possible



## Over/Underestimation (%)

Overall overestimation increased by 3.7 percentage points in 2017

Due to low participation, a reasonable breakdown into sales volume groups was not possible



## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | | | | 7 | 3 |
| Validated market share in unit terms | | | | 12% | 4% |
| Validated product forms | | | | 168 | 29 |

## Actions

Motivate more clients to participate in the validation study

# Bulgaria
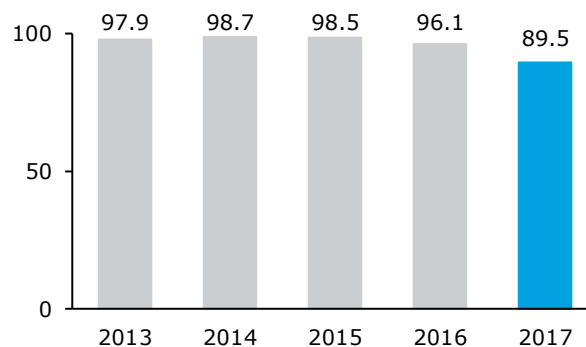
## Precision (%)

Overall precision index declined by 6.6 percentage points in 2017

Large product forms reached 92.2%, medium 88.6% and small 82.0%

Forms validated in both years, 2016 and 2017, declined by 5.4 percentage points to 90.0% in 2017
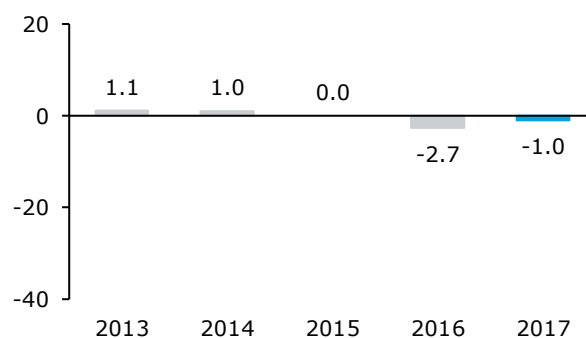


## Over/Underestimation (%)

Overall underestimation improved by 1.7 percentage points in 2017

Large product forms were overestimated by 1.0%, medium were underestimated by 3.2%, and small by 2.8%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.6 percentage points to 2.7% in 2017



## Participation

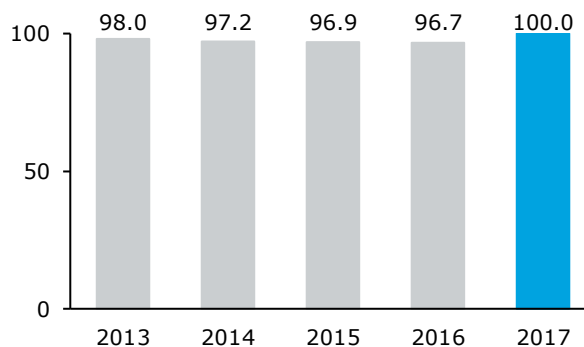| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 58 | 46 | 18 | 33 | **50** |
| Validated market share in unit terms | 58% | 52% | 21% | 21% | **29%** |
| Validated product forms | 826 | 762 | 246 | 419 | **581** |

## Actions

Evaluate projection level

# Canada

## Precision (%)

Overall precision index improved by 3.3 percentage points in 2017

Large and medium product forms both reached a perfect 100%, small forms reached 99.7%

Forms validated in both years, 2016 and 2017, improved by 3.1 percentage points to 100% in 2017

Chart (Precision %):
- 2013: 98.0
- 2014: 97.2
- 2015: 96.9
- 2016: 96.7
- 2017: 100.0

## Over/Underestimation (%)

Overall bias turned from 1% overestimation to 1% underestimation in 2017

Large product forms were underestimated by 1.5%, medium by 0.2%, and small by 1.1%

Overall bias of forms validated in both years, 2016 and 2017, turned from 1.2% overestimation to 2.3% underestimation in 2017

Chart (Over/Underestimation %):
- 2013: 0.5
- 2014: 0.9
- 2015: 0.9
- 2016: 1.0
- 2017: -1.0

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 94 | 100 | 113 | 125 | **250** |
| Validated market share in unit terms | 95% | 95% | 95% | 95% | **95%** |
| Validated product forms | 3,381 | 3,414 | 3,439 | 3,576 | **6,551** |

## Actions
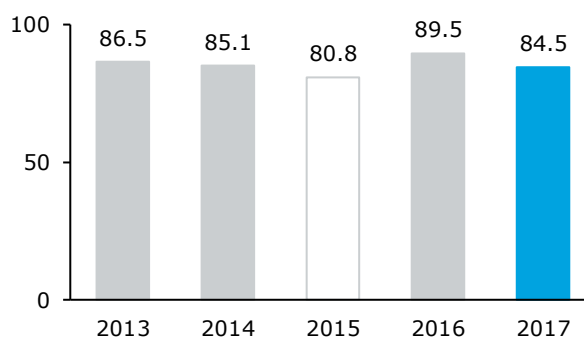
No action required from the statistical point of view

# Central America

## Precision (%)

Overall precision index declined by 5.0 percentage points in 2017

Large product forms reached 88.5%, medium 82.6% and small 74.8%

Forms validated in both years, 2016 and 2017, declined by 2.2 percentage points to 87.7% in 2017
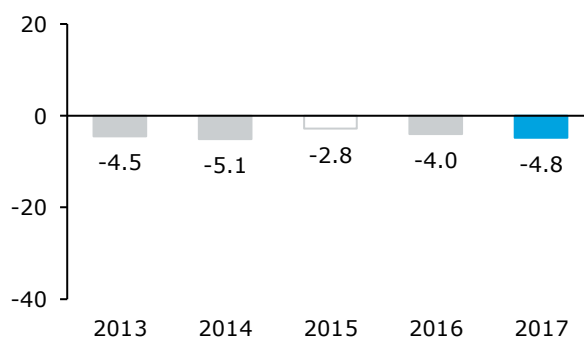


## Over/Underestimation (%)

Overall underestimation increased slightly by 0.8 percentage points in 2017

Large product forms were underestimated by 5.7%, medium by 3.4%, and small by 3.3%

Underestimation of forms validated in both years, 2016 and 2017, increased by 1.8 percentage points to 6.0% in 2017



## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 26 | 14 | 4 | 18 | **25** |
| Validated market share in unit terms | 32% | 23% | 5% | 12% | **26%** |
| Validated product forms | 1,675 | 1,124 | 283 | 831 | **1,427** |

## Actions

Update channel survey

Review projection level
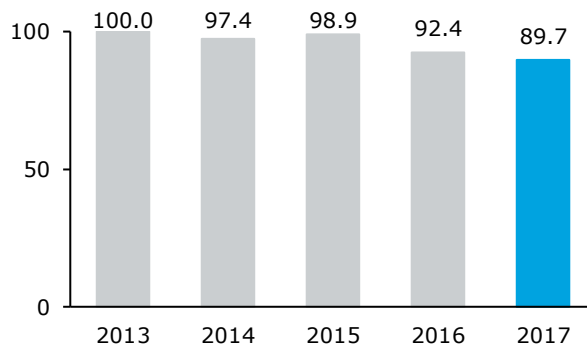
## Precision (%)

Overall precision index declined by 2.7 percentage points in 2017

Medium product forms reached 90.1% and small 88.9%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 5.4 percentage points to 92.9% in 2017
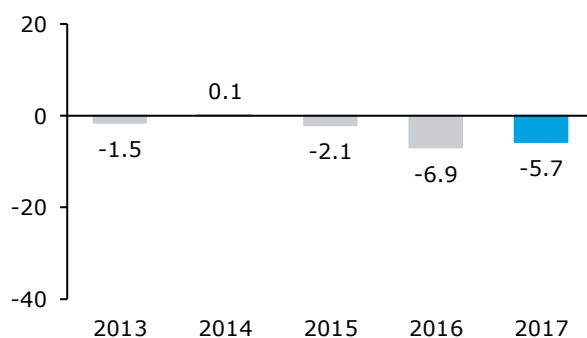


## Over/Underestimation (%)

Overall underestimation improved by 1.2 percentage points in 2017

Medium product forms were underestimated by 5.5%, and small by 6.8%. A minor number of large product forms were grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, improved by 3.6 percentage points to 0.7% in 2017



## Participation

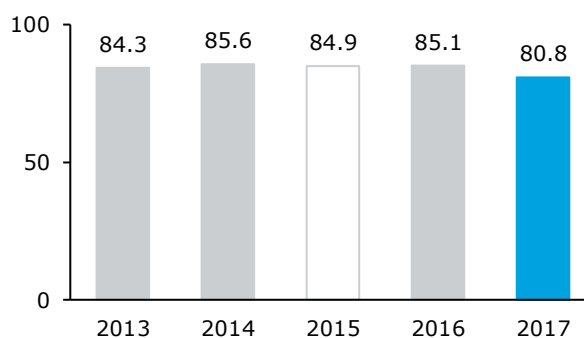| Participation | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 13 | 16 | 9 | 9 | **12** |
| Validated market share in unit terms | 18% | 19% | 13% | 13% | **17%** |
| Validated product forms | 709 | 838 | 581 | 473 | **466** |

## Actions

Check and recruit new players not in panel

# Colombia

## Precision (%)

Overall precision index declined by 4.3 percentage points in 2017

Large product forms reached 79.2%, medium 89.3% and small 69.3%

Forms validated in both years, 2016 and 2017, declined by 5.5 percentage points to 81.3% in 2017
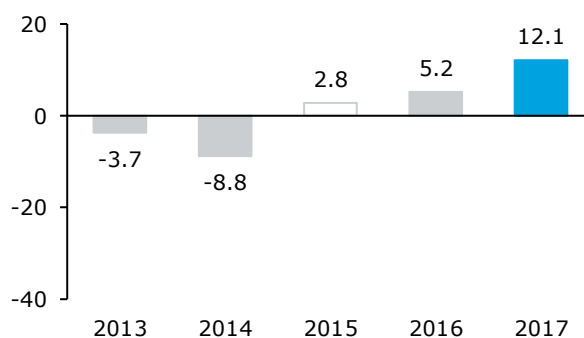


## Over/Underestimation (%)

Overall overestimation increased by 6.9 percentage points in 2017

Large product forms were overestimated by 11.1%, medium by 15.3%, and small by 8.4%

Overestimation of forms validated in both years, 2016 and 2017, increased by 7.5 percentage points to 12.8% in 2017



## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 14 | 11 | 8 | 24 | **18** |
| Validated market share in unit terms | 18% | 16% | 5% | 23% | **18%** |
| Validated product forms | 810 | 615 | 371 | 1,281 | **771** |

## Actions

Revised projection level was implemented in 2019M01, retroactive to 2016M01. Impact of modification to be seen in future reports.
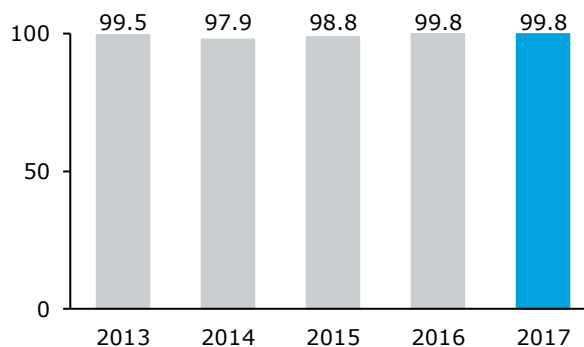
# Croatia

## Precision (%)

Overall precision index remained unchanged in 2017

Large and medium product forms both reached a perfect 100%, small forms reached 98.5%

Forms validated in both years, 2016 and 2017, remained unchanged at 100% in 2017

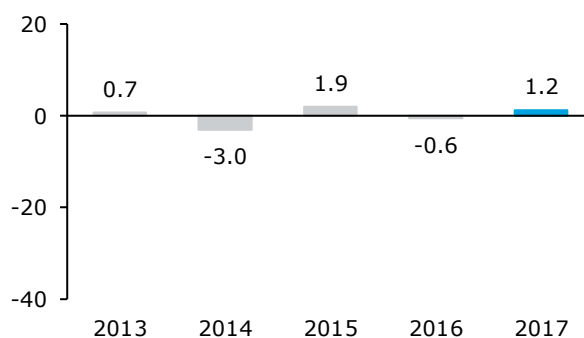| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 99.5 | 97.9 | 98.8 | 99.8 | 99.8 |

## Over/Underestimation (%)

Overall bias turned from 0.6% underestimation to 1.2% overestimation in 2017

Large product forms were overestimated by 1.7%, medium by 0.6%, and small by 0.4%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.1 percentage points to 0.5% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 0.7 | -3.0 | 1.9 | -0.6 | 1.2 |

## Participation

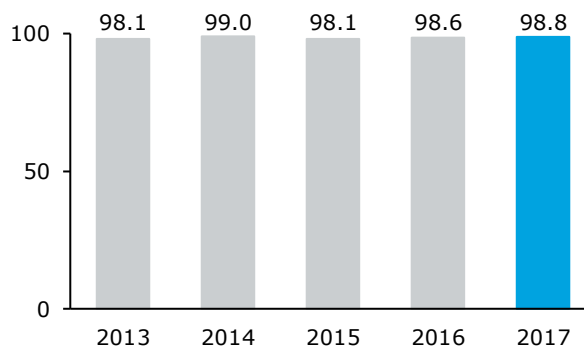| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 11 | 9 | 8 | 11 | **9** |
| Validated market share in unit terms | 37% | 49% | 24% | 30% | **23%** |
| Validated product forms | 535 | 649 | 350 | 402 | **359** |

## Actions

No action required from the statistical point of view

# Czech Republic

## Precision (%)

Overall precision index improved slightly by 0.2 percentage points in 2017

Large product forms reached 99.1%, medium 98.9% and small 97.5%

Forms validated in both years, 2016 and 2017, improved slightly by 0.1 percentage points to 99.2% in 2017

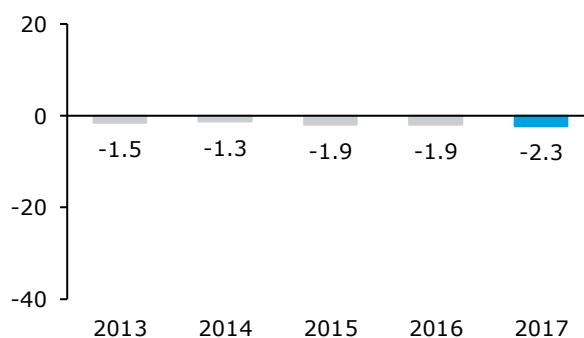| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 98.1 | 99.0 | 98.1 | 98.6 | 98.8 |

## Over/Underestimation (%)

Overall underestimation increased slightly by 0.4 percentage points in 2017

Large product forms were underestimated by 2.2%, medium by 2.2%, and small by 2.4%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.3 percentage points to 1.9% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -1.5 | -1.3 | -1.9 | -1.9 | -2.3 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 22 | 27 | 21 | 20 | **22** |
| Validated market share in unit terms | 44% | 43% | 40% | 39% | **48%** |
| Validated product forms | 1,148 | 1,193 | 982 | 1,040 | **1,267** |

## Actions

No action required from the statistical point of view

# Dominican Republic
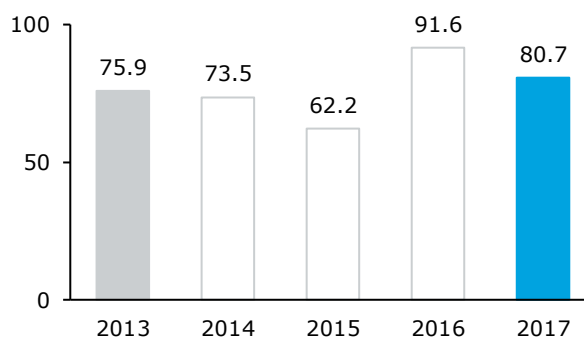
## Precision (%)

Overall precision index declined by 10.9 percentage points in 2017

Large product forms reached 85.0%, medium 74.9% and small 77.9%

Forms validated in both years, 2016 and 2017, declined by 3.6 percentage points to 91.8% in 2017

Chart (Precision %), bars by year:
- 2013: 75.9
- 2014: 73.5
- 2015: 62.2
- 2016: 91.6
- 2017: 80.7

Y-axis: 0, 50, 100

## Over/Underestimation (%)

Overall underestimation increased by 3.9 percentage points in 2017

Large product forms were underestimated by 3.5%, medium by 5.7%, and small by 7.4%

Underestimation of forms validated in both years, 2016 and 2017, increased by 2.2 percentage points to 3.6% in 2017

Chart (Over/Underestimation %), values by year:
- 2013: -1.3
- 2014: 1.9
- 2015: -13.1
- 2016: -0.9
- 2017: -4.8

Y-axis: -40, -20, 0, 20

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 22 | 10 | 10 | 11 | **18** |
| Validated market share in unit terms | 27% | 9% | 6% | 6% | **23%** |
| Validated product forms | 1,387 | 459 | 351 | 373 | **1,190** |

## Actions

Projection errors were corrected and pharmacy universe was updated. For 2019 updated distribution survey is planned.

# Ecuador

## Precision (%)
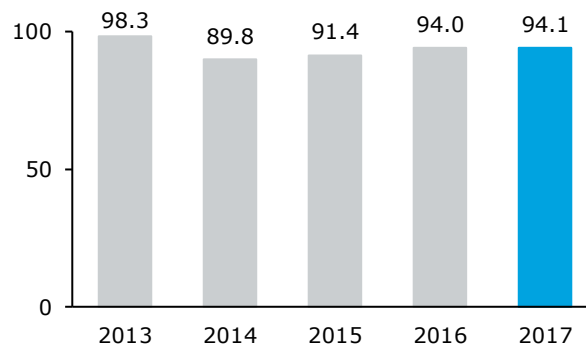
Overall precision index improved slightly by 0.1 percentage points in 2017

Large product forms reached 98.0%, medium 92.7% and small 84.1%

Forms validated in both years, 2016 and 2017, declined by 1.0 percentage point to 94.0% in 2017

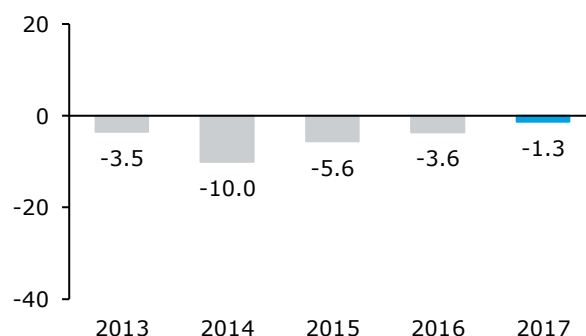| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 98.3 | 89.8 | 91.4 | 94.0 | 94.1 |

## Over/Underestimation (%)

Overall underestimation improved by 2.3 percentage points in 2017

Large product forms were underestimated by 1.8%, medium by 0.3%, and small by 1.6%

Underestimation of forms validated in both years, 2016 and 2017, improved by 1.8 percentage points to 0.5% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -3.5 | -10.0 | -5.6 | -3.6 | -1.3 |

## Participation

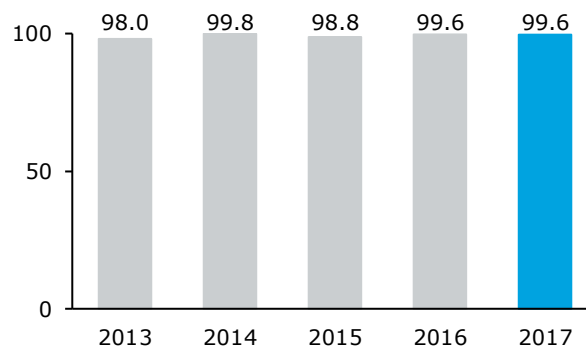| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 80 | 49 | 36 | 38 | **39** |
| Validated market share in unit terms | 62% | 47% | 24% | 46% | **38%** |
| Validated product forms | 2,119 | 1,363 | 896 | 1,501 | **1,334** |

## Actions

Update pharmacy universe

# Egypt

## Precision (%)

Overall precision index remained unchanged in 2017

Large and medium product forms both reached a perfect 100%, small forms reached 97.5%

Forms validated in both years, 2016 and 2017, declined slightly by 0.1 percentage points to 99.6% in 2017

Chart — Precision (%) by year:
- 2013: 98.0
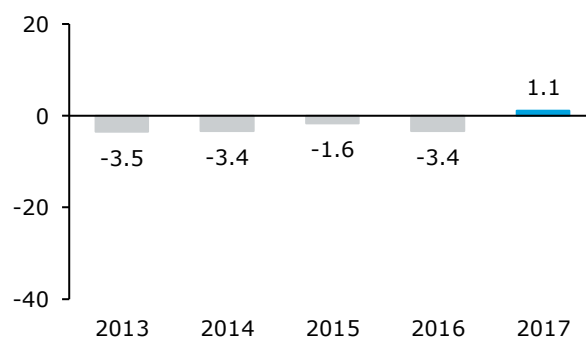- 2014: 99.8
- 2015: 98.8
- 2016: 99.6
- 2017: 99.6

## Over/Underestimation (%)

Overall bias turned from 3.4% underestimation to 1.1% overestimation in 2017

Large product forms were overestimated by 1.6%, medium by 0.7%, small were underestimated by 0.4%

Underestimation of forms validated in both years, 2016 and 2017, improved by 4.4 percentage points to 0.2% in 2017

Chart — Over/Underestimation (%) by year:
- 2013: -3.5
- 2014: -3.4
- 2015: -1.6
- 2016: -3.4
- 2017: 1.1

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 49 | 24 | 50 | 40 | **29** |
| Validated market share in unit terms | 22% | 15% | 29% | 17% | **16%** |
| Validated product forms | 542 | 408 | 695 | 522 | **401** |

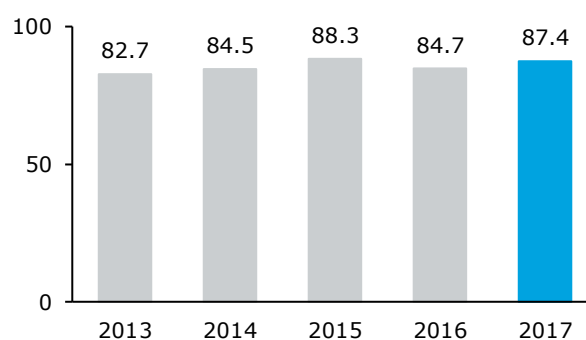## Actions

No action required from the statistical point of view

# Estonia

## Precision (%)

Overall precision index improved by 2.7 percentage points in 2017

Large product forms reached 93.9%, medium 86.7% and small 67.1%

Forms validated in both years, 2016 and 2017, improved by 1.2 percentage points to 87.8% in 2017

**Precision chart (2013–2017)**

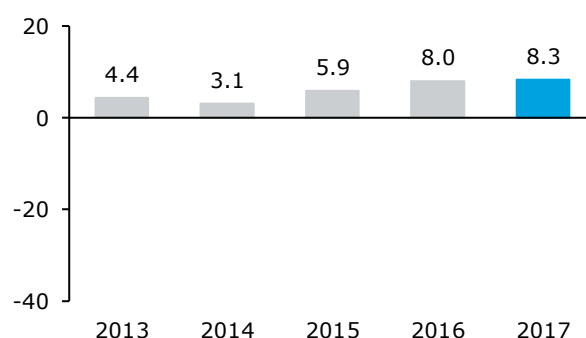| Year | Value |
|------|-------|
| 2013 | 82.7 |
| 2014 | 84.5 |
| 2015 | 88.3 |
| 2016 | 84.7 |
| 2017 | 87.4 |

## Over/Underestimation (%)

Overall overestimation increased slightly by 0.3 percentage points in 2017

Large product forms were overestimated by 10.2%, medium by 5.0%, and small by 2.4%

Overestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.1 percentage points to 9.2% in 2017

**Over/Underestimation chart (2013–2017)**

| Year | Value |
|------|-------|
| 2013 | 4.4 |
| 2014 | 3.1 |
| 2015 | 5.9 |
| 2016 | 8.0 |
| 2017 | 8.3 |

## Participation

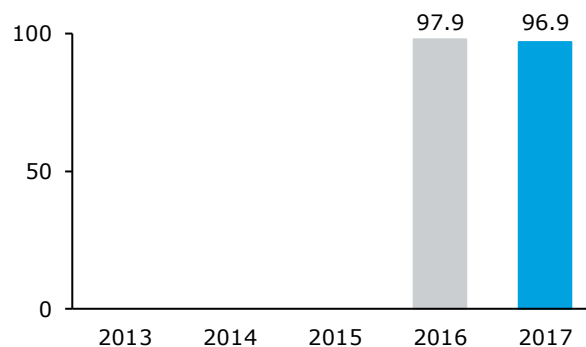| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 10 | 14 | 12 | 19 | **12** |
| Validated market share in unit terms | 21% | 25% | 17% | 19% | **11%** |
| Validated product forms | 265 | 422 | 277 | 287 | **194** |

## Actions

Review projection level

# France

## Precision (%)

Overall precision index declined by 1.0 percentage point in 2017

Large product forms reached 97.7%, medium 96.5% and small 95.2%

Forms validated in both years, 2016 and 2017, improved slightly by 0.4 percentage points to 98.3% in 2017

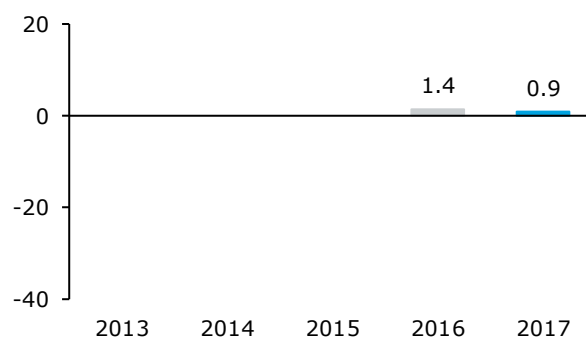| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | | | | 97.9 | 96.9 |

## Over/Underestimation (%)

Overall overestimation improved slightly by 0.5 percentage points in 2017

Large product forms were overestimated by 0.7%, medium by 1.4%, and small by 0.7%

Overestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.5 percentage points to 0.9% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | | | | 1.4 | 0.9 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | | | | 149 | **148** |
| Validated market share in unit terms | | | | 94% | **94%** |
| Validated product forms | | | | 3,339 | **3,327** |

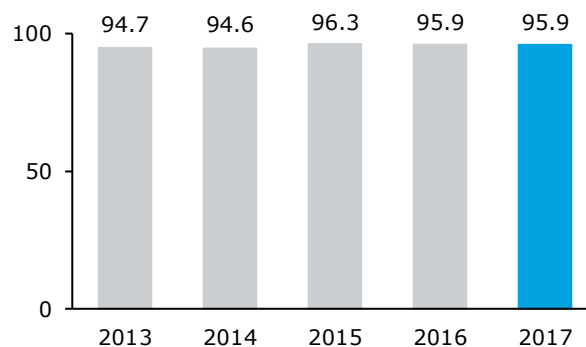## Actions

No action required from the statistical point of view

# Germany

## Precision (%)

Overall precision index remained unchanged in 2017

Large product forms reached 98.0%, medium 94.9% and small 90.9%

Forms validated in both years, 2016 and 2017, declined slightly by 0.5 percentage points to 95.6% in 2017
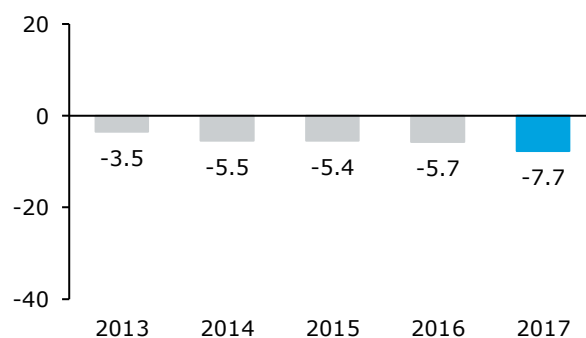


## Over/Underestimation (%)

Overall underestimation increased by 2.0 percentage points in 2017

Large product forms were underestimated by 8.3%, medium by 6.9%, and small by 6.1%

Underestimation of forms validated in both years, 2016 and 2017, increased by 1.6 percentage points to 7.0% in 2017



## Participation

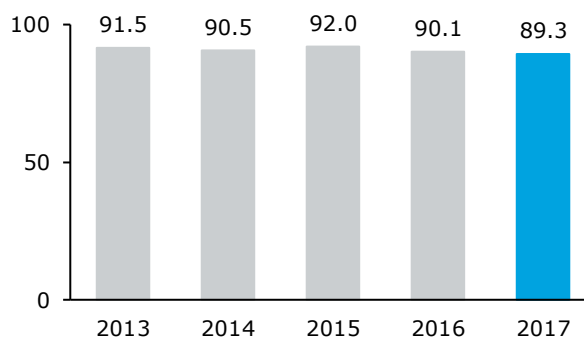| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 30 | 32 | 32 | 30 | **29** |
| Validated market share in unit terms | 26% | 26% | 25% | 20% | **19%** |
| Validated product forms | 3,059 | 2,995 | 3,010 | 2,330 | **2,150** |

## Actions

No action required from the statistical point of view

# Greece

## Precision (%)

Overall precision index declined slightly by 0.8 percentage points in 2017

Large product forms reached 93.4%, medium 86.9% and small 80.4%

Forms validated in both years, 2016 and 2017, declined by 1.0 percentage point to 91.6% in 2017

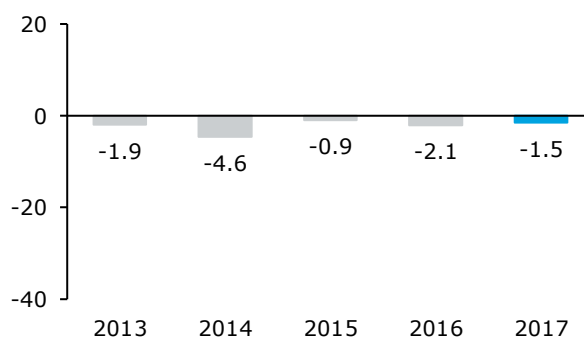| Year | Value |
|------|-------|
| 2013 | 91.5 |
| 2014 | 90.5 |
| 2015 | 92.0 |
| 2016 | 90.1 |
| 2017 | 89.3 |

## Over/Underestimation (%)

Overall underestimation improved slightly by 0.6 percentage points in 2017

Large product forms were underestimated by 1.4%, medium by 1.7%, and small by 1.7%

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.8 percentage points to 0.8% in 2017

| Year | Value |
|------|-------|
| 2013 | -1.9 |
| 2014 | -4.6 |
| 2015 | -0.9 |
| 2016 | -2.1 |
| 2017 | -1.5 |

## Participation

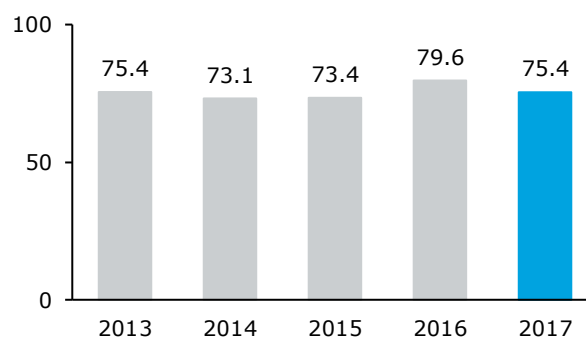| | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|
| Participating companies | 76 | 87 | 86 | 81 | **66** |
| Validated market share in unit terms | 68% | 68% | 66% | 64% | **54%** |
| Validated product forms | 964 | 1,083 | 1,110 | 1,117 | **955** |

## Actions

No action required from the statistical point of view

# Hong Kong

## Precision (%)

Overall precision index declined by 4.2 percentage points in 2017

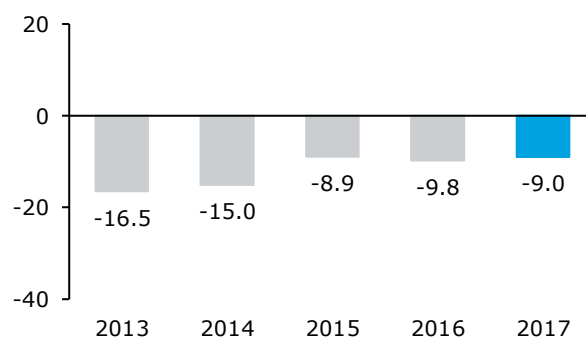Large product forms reached 77.0%, medium 72.9% and small 75.1%

Chart values by year:
- 2013: 75.4
- 2014: 73.1
- 2015: 73.4
- 2016: 79.6
- 2017: 75.4

## Over/Underestimation (%)

Overall underestimation improved slightly by 0.8 percentage points in 2017

Large product forms were underestimated by 5.3%, medium by 10.4% and small by 18.4%

Chart values by year:
- 2013: -16.5
- 2014: -15.0
- 2015: -8.9
- 2016: -9.8
- 2017: -9.0

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 25 | 27 | 31 | 26 | **39** |
| Validated market share in unit terms | 17% | 16% | 19% | 23% | **25%** |
| Validated product forms | 901 | 869 | 943 | 983 | **1,205** |

## Actions

No action required from the statistical point of view

# Hungary
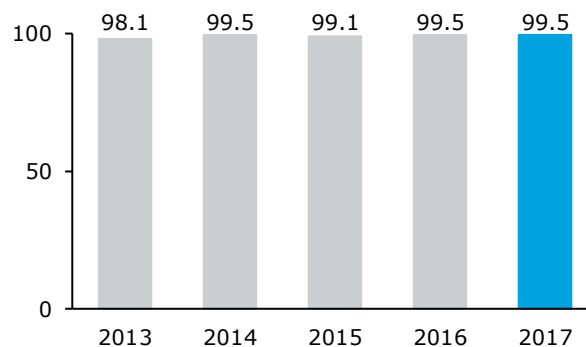
## Precision (%)

Overall precision index remained unchanged in 2017

Large product forms reached a perfect 100%, medium forms reached 99.8% and small 97.4%

Forms validated in both years, 2016 and 2017, remained unchanged at 99.5% in 2017

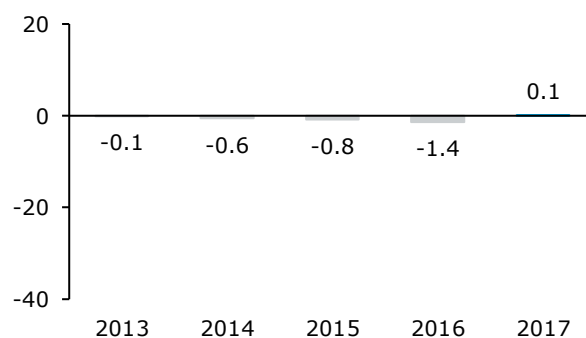| | | | | |
|---|---|---|---|---|
| 98.1 | 99.5 | 99.1 | 99.5 | 99.5 |
| 2013 | 2014 | 2015 | 2016 | 2017 |

## Over/Underestimation (%)

Overall bias turned from 1.4% underestimation to 0.1% overestimation in 2017

Large product forms were overestimated by 0.6%, medium were underestimated by 0.4%, and small by 0.8%

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.4 percentage points to 1.1% in 2017

| 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| -0.1 | -0.6 | -0.8 | -1.4 | 0.1 |

## Participation

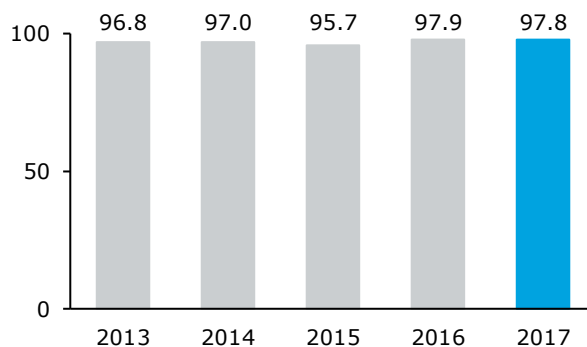| Participation | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 84 | 88 | 91 | 66 | **53** |
| Validated market share in unit terms | 76% | 74% | 69% | 47% | **57%** |
| Validated product forms | 1,696 | 1,743 | 1,550 | 1,124 | **1,220** |

## Actions

No action required from the statistical point of view

# Italy

## Precision (%)

Overall precision index declined slightly by 0.1 percentage points in 2017

Large product forms reached 99.4%, medium 97.1% and small 93.6%

Forms validated in both years, 2016 and 2017, declined slightly by 0.3 percentage points to 97.4% in 2017

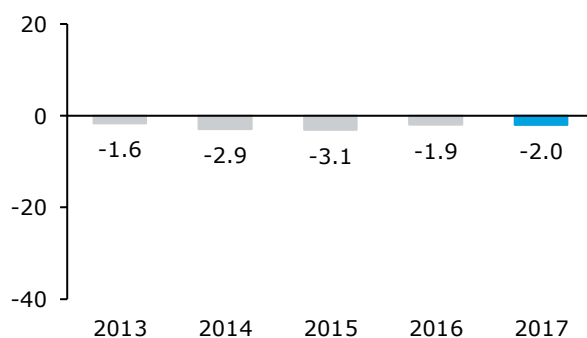| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 96.8 | 97.0 | 95.7 | 97.9 | 97.8 |

## Over/Underestimation (%)

Overall underestimation increased slightly by 0.1 percentage points in 2017

Large product forms were underestimated by 2.3%, medium by 1.9%, and small by 0.3%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.8 percentage points to 2.5% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -1.6 | -2.9 | -3.1 | -1.9 | -2.0 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 31 | 22 | 15 | 35 | **27** |
| Validated market share in unit terms | 28% | 21% | 11% | 32% | **29%** |
| Validated product forms | 1,001 | 684 | 485 | 1,169 | **1,111** |

## Actions

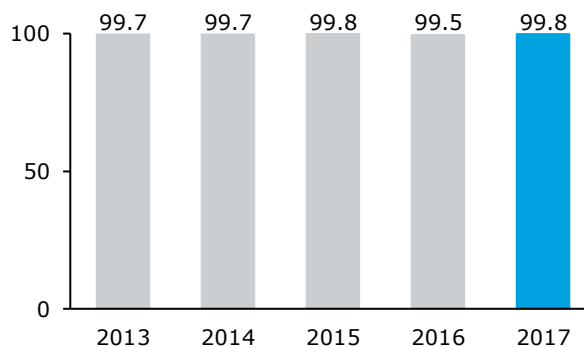No action required from the statistical point of view

# Japan

## Retail+Hospital Validation Study

### Precision (%)

Overall precision index improved slightly by 0.3 percentage points in 2017

Large product forms reached 99.9%, medium 99.8% and small 99.6%

Forms validated in both years, 2016 and 2017, remained unchanged at 99.8% in 2017
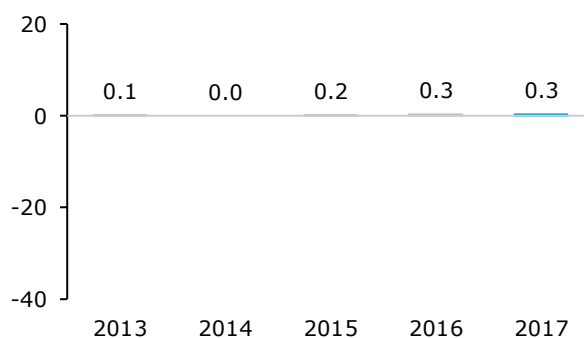


### Over/Underestimation (%)

Overall overestimation remained unchanged in 2017

Large product forms were overestimated by 0.3%, medium were underestimated by 0.3%, and small by 0.3%

Overestimation of forms validated in both years, 2016 and 2017, remained unchanged at 0.3% in 2017



### Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 55 | 59 | 62 | 56 | **42** |
| Validated market share in unit terms | 70% | 73% | 65% | 55% | **45%** |
| Validated product forms | 3,096 | 3,571 | 3,443 | 3,194 | **2,810** |

### Actions

No action required from the statistical point of view

**acts 2018**

# Kazakhstan

## Precision (%)

Overall precision index declined slightly by 0.9 percentage points in 2017

Medium product forms reached 58.7% and small 68.5%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 6.1 percentage points to 62.4% in 2016
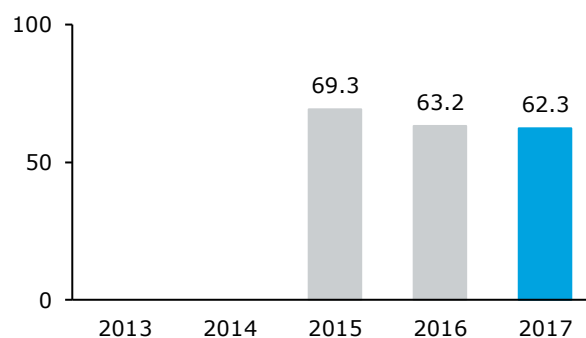


## Over/Underestimation (%)

Overall overestimation increased by 13.5 percentage points in 2017

Medium product forms were overestimated by 17.1% and small by 8.7%. A minor number of large product forms were grouped into the medium group for analysis

Overestimation of forms validated in both years, 2016 and 2017, increased by 16.3 percentage points to 17.2% in 2017
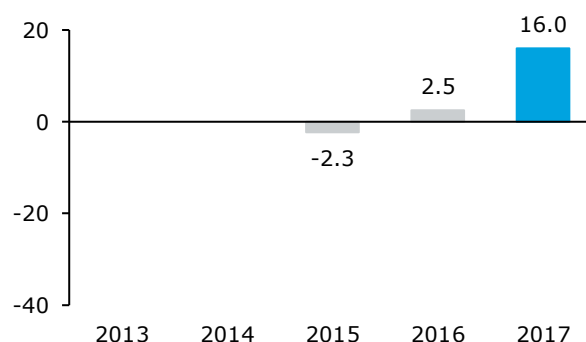


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | | | 18 | 27 | **32** |
| Validated market share in unit terms | | | 14% | 13% | **15%** |
| Validated product forms | | | 468 | 408 | **412** |

## Actions

Analyze root cause for deteriorated results and implement strict quality checks for the input

# Kuwait

## Precision (%)

Overall precision index improved slightly by 0.8 percentage points to a perfect 100% in 2017

All sales volume groups reached 100%

Forms validated in both years, 2016 and 2017, improved slightly by 0.5 percentage points to 100% in 2017

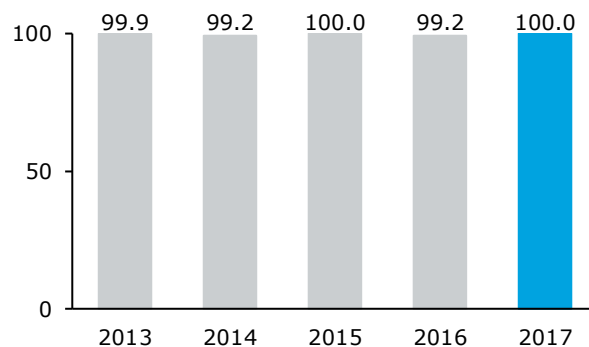| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 99.9 | 99.2 | 100.0 | 99.2 | 100.0 |

## Over/Underestimation (%)

Overall underestimation increased slightly by 0.9 percentage points in 2017

Large product forms were underestimated by 1.3%, medium by 1.0%, and small by 0.9%

Overall bias of forms validated in both years, 2016 and 2017, turned from 0.1% overestimation to 1.4% underestimation in 2017
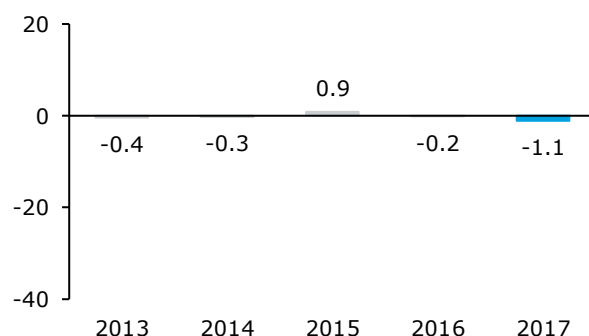
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -0.4 | -0.3 | 0.9 | -0.2 | -1.1 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 33 | 22 | 9 | 10 | **16** |
| Validated market share in unit terms | 51% | 34% | 11% | 11% | **23%** |
| Validated product forms | 579 | 419 | 196 | 167 | **294** |

## Actions

No action required from the statistical point of view

# Latvia

## Precision (%)

Overall precision index improved by 4.3 percentage points in 2017

Large product forms reached 93.4%, medium 87.2% and small 81.3%

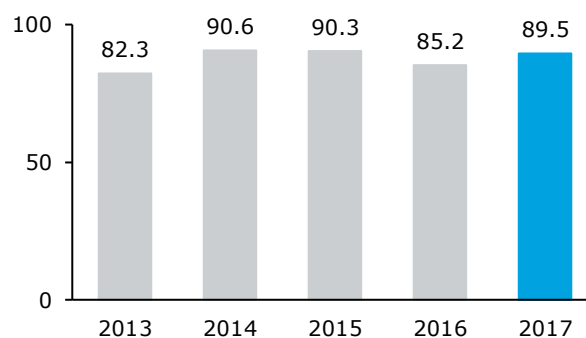Forms validated in both years, 2016 and 2017, improved by 3.7 percentage points to 87.5% in 2017



## Over/Underestimation (%)

Overall overestimation deteriorated by 3.4 percentage points in 2017

Large product forms were overestimated by 15.1%, medium by 13.1% and small by 11.7%

Overestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.1 percentage points to 12.1% in 2017
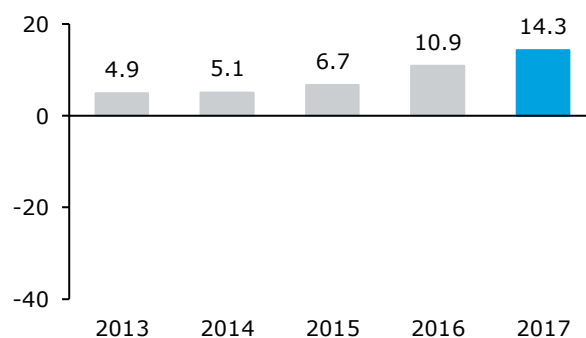


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 11 | 25 | 22 | 44 | **21** |
| Validated market share in unit terms | 19% | 36% | 15% | 23% | **25%** |
| Validated product forms | 335 | 737 | 398 | 543 | **481** |

## Actions

Review projection level

# Lebanon

## Precision (%)

Overall precision index declined by 2.7 percentage points in 2017

Medium product forms reached 89.0% and small 96.6%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 1.5 percentage points to 95.5% in 2017
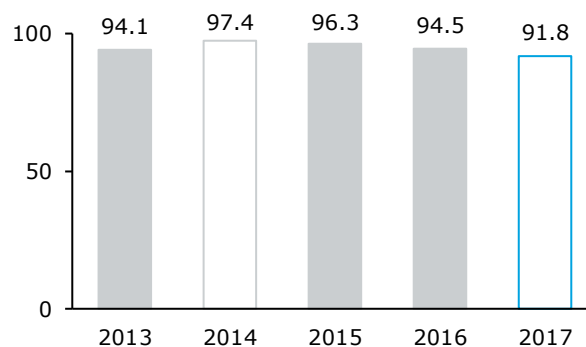


## Over/Underestimation (%)

Overall overestimation improved slightly by 0.6 percentage points in 2017

Medium product forms were overestimated by 6.5%, and small by 3.0%. A minor number of large product forms were grouped into the medium class for analysis

Overestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.3 percentage points to 6.6% in 2017
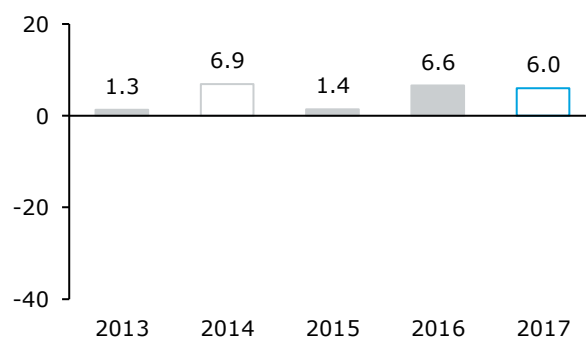


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 19 | 8 | 26 | 25 | **13** |
| Validated market share in unit terms | 15% | 8% | 18% | 10% | **7%** |
| Validated product forms | 290 | 118 | 355 | 288 | **141** |

## Actions

Increase and stabilize client participation in validation studies

# Lithuania

## Precision (%)

Overall precision index declined by 2.2 percentage points in 2017

Large product forms reached 98.1%, medium 96.8% and small 86.4%

Forms validated in both years, 2016 and 2017, declined by 2.3 percentage points to 96.1% in 2017

| Year | Value |
|------|-------|
| 2013 | 98.5 |
| 2014 | 99.1 |
| 2015 | 98.7 |
| 2016 | 98.0 |
| 2017 | 95.8 |
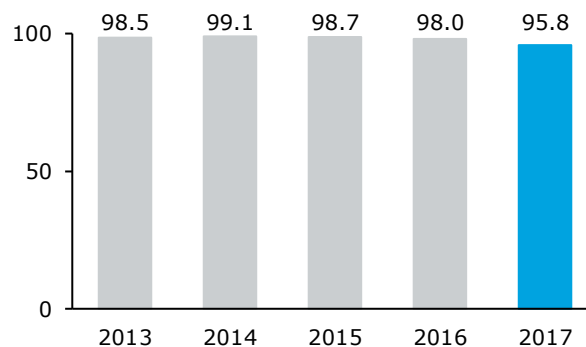
## Over/Underestimation (%)

Overall bias turned from 0.7% underestimation to 0.3% overestimation in 2017

Large product forms were overestimated by 0.6%, medium product forms showed no bias, small were underestimated by 2.2%

Overall bias of forms validated in both years, 2016 and 2017, turned from 0.3% underestimation to 0.2% overestimation in 2017

| Year | Value |
|------|-------|
| 2013 | 2.5 |
| 2014 | 3.2 |
| 2015 | -1.3 |
| 2016 | -0.7 |
| 2017 | 0.3 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 11 | 25 | 25 | 42 | **27** |
| Validated market share in unit terms | 17% | 30% | 26% | 35% | **30%** |
| Validated product forms | 266 | 619 | 496 | 590 | **469** |

## Actions

Improvement through WHS expansion

# Malaysia

## Precision (%)

Overall precision index declined by 2.2 percentage points in 2017

Large product forms reached 85.0%, medium 86.4% and small 84.5%
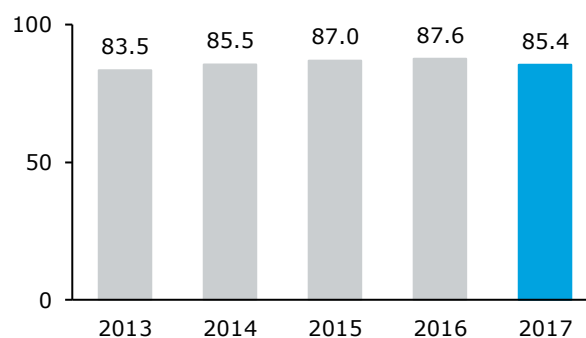


## Over/Underestimation (%)

Overall underestimation improved by 2.0 percentage points in 2017

Large product forms were underestimated by 1.7%, medium by 3.2% and small by 3.2%
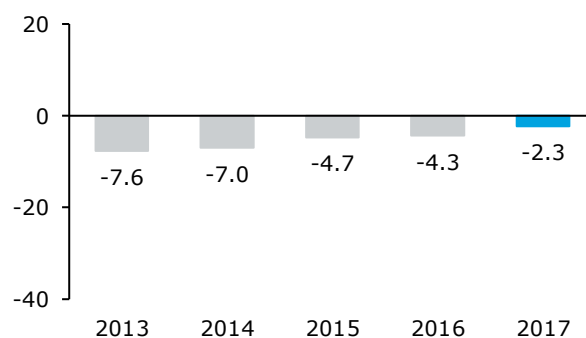


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 74 | 88 | 89 | 94 | **92** |
| Validated market share in unit terms | 32% | 29% | 30% | 28% | **31%** |
| Validated product forms | 3,392 | 4,430 | 5,074 | 5,416 | **5,800** |

## Actions

New pharmacy data onboarding in 2018

# Mexico

## Precision (%)

Overall precision index declined by 5.1 percentage points in 2017

Large product forms reached 83.9%, medium 93.1% and small 73.8%

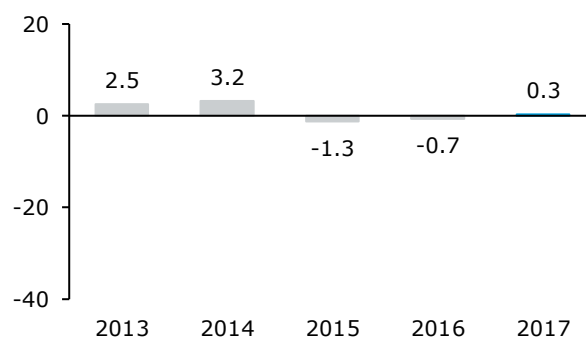Forms validated in both years, 2016 and 2017, declined by 9.9 percentage points to 84.8% in 2017

| Year | Value |
|------|-------|
| 2013 | 91.5 |
| 2014 | 87.6 |
| 2015 | 89.2 |
| 2016 | 90.3 |
| 2017 | 85.2 |
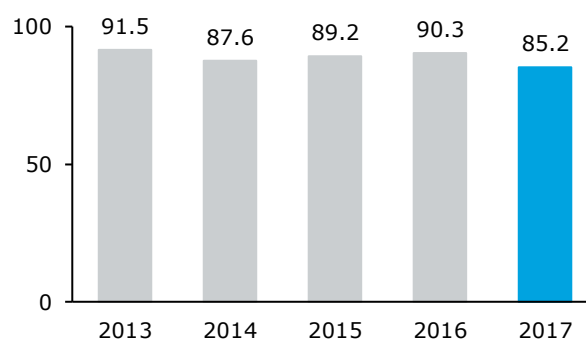
## Over/Underestimation (%)

Overall underestimation increased by 1.3 percentage points in 2017

Large product forms were underestimated by 15.5%, medium by 4.8%, and small by 6.6%

Underestimation of forms validated in both years, 2016 and 2017, increased by 6.1 percentage points to 11.5% in 2017

| Year | Value |
|------|-------|
| 2013 | 6.8 |
| 2014 | 0.7 |
| 2015 | -6.4 |
| 2016 | -8.0 |
| 2017 | -9.3 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 23 | 16 | 18 | 23 | **31** |
| Validated market share in unit terms | 31% | 24% | 17% | 19% | **15%** |
| Validated product forms | 1,548 | 1,151 | 1,008 | 1,108 | **998** |

## Actions

Correct coverage issue: review projection structure or inclusion of new relevant wholesalers

# Morocco

## Precision (%)

Overall precision index improved by 6.4 percentage points in 2017

Large product forms reached 96.5%, medium 91.5% and small 87.5%

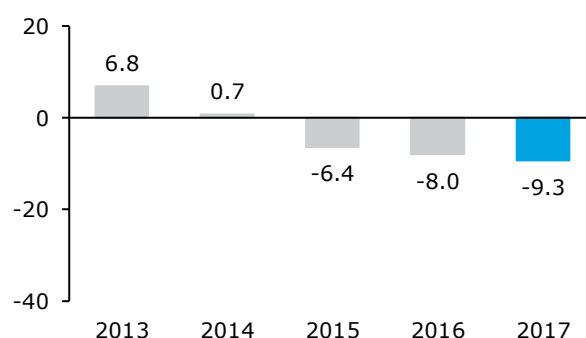Forms validated in both years, 2016 and 2017, improved by 6.8 percentage points to 93.7% in 2017
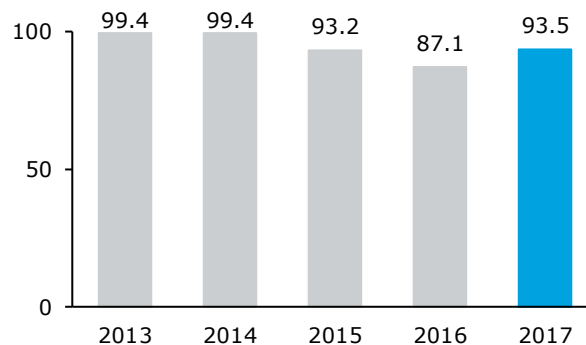


## Over/Underestimation (%)

Overall underestimation improved by 1.7 percentage points in 2017

Large product forms were underestimated by 3.8%, medium by 6.9% and small by 9.3%

Underestimation of forms validated in both years, 2016 and 2017, improved by 1.8 percentage points to 4.3% in 2017
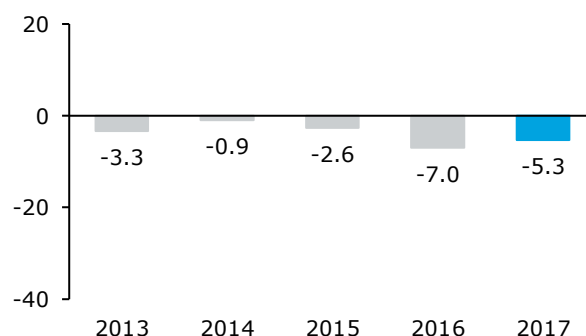


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 63 | 66 | 37 | 38 | **36** |
| Validated market share in unit terms | 36% | 47% | 20% | 27% | **26%** |
| Validated product forms | 650 | 703 | 336 | 420 | **402** |

## Actions

No action required from the statistical point of view

# Pakistan

## Precision (%)

Overall precision index improved by 1.2 per-centage points in 2017

Large product forms reached 98.0%, medium 96.1% and small 88.8%

Forms validated in both years, 2016 and 2017, declined slightly by 0.2 percentage points to 96.9% in 2017



## Over/Underestimation (%)

Overall underestimation increased slightly by 0.4 percentage points in 2017

Large product forms were overestimated by 0.2%, medium were underestimated by 2.0% and small by 2.9%

Bias of forms validated in both years, 2016 and 2017, turned from no bias in 2016 to 0.1% overestimation in 2017



## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 101 | 94 | 93 | 67 | **58** |
| Validated market share in unit terms | 70% | 73% | 77% | 64% | **60%** |
| Validated product forms | 2,474 | 2,524 | 2,506 | 2,006 | **1,929** |

## Actions

Maintain the participation level of the validation study

# Paraguay

## Precision (%)

Overall precision index declined slightly by 0.8 percentage points in 2017

Large product forms reached 54.0%, medium 71.3% and small 61.6%

Forms validated in both years, 2016 and 2017, declined by 3.3 percentage points to 58.2% in 2017

| Year | Value |
|------|-------|
| 2013 | 37.1 |
| 2014 | 27.6 |
| 2015 | 36.1 |
| 2016 | 61.5 |
| 2017 | 60.7 |

## Over/Underestimation (%)

Overall underestimation increased by 10.5 percentage points in 2017

Large product forms were underestimated by 36.6%, medium by 23.1% and small by 25.1%

Underestimation of forms validated in both years, 2016 and 2017, improved by 8.2 percentage points to 31.7% in 2017

| Year | Value |
|------|-------|
| 2013 | -32.4 |
| 2014 | -46.1 |
| 2015 | -20.4 |
| 2016 | -20.6 |
| 2017 | -31.1 |

## Participation

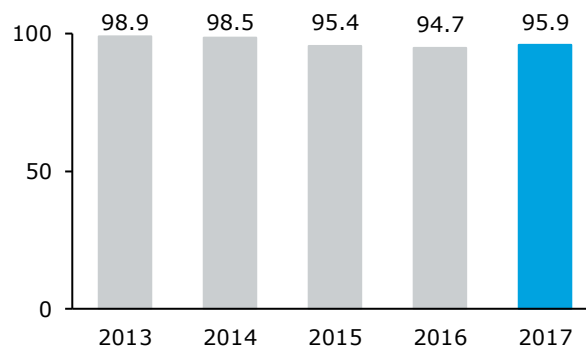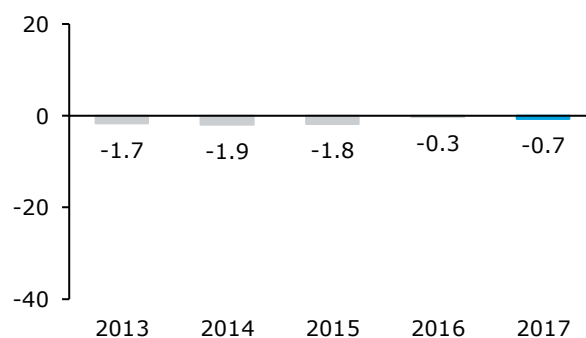| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 68 | 82 | 83 | 91 | **95** |
| Validated market share in unit terms | 47% | 51% | 44% | 61% | **50%** |
| Validated product forms | 1,386 | 1,553 | 1,508 | 1,906 | **1,618** |

## Actions

Update channel survey, universe and projection level

# Peru

## Precision (%)

Overall precision index improved by 3.4 percentage points in 2017

Large product forms reached 91.8%, medium 91.8% and small 91.7%

Forms validated in both years, 2016 and 2017, declined by 1.3 percentage points to 92.5% in 2017
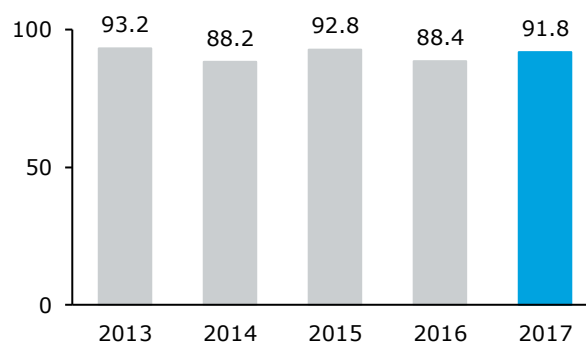
**Chart (Precision %):**

| Year | Value |
|------|-------|
| 2013 | 93.2 |
| 2014 | 88.2 |
| 2015 | 92.8 |
| 2016 | 88.4 |
| 2017 | 91.8 |

## Over/Underestimation (%)

Overall underestimation improved by 1.5 percentage points in 2017

Large product forms were underestimated by 2.1%, medium by 3.3%, and small by 3.4%

Overall bias of forms validated in both years, 2016 and 2017, turned from 4.4% underestimation to no bias in 2017

**Chart (Over/Underestimation %):**

| Year | Value |
|------|-------|
| 2013 | -7.0 |
| 2014 | -7.9 |
| 2015 | 2.0 |
| 2016 | -4.0 |
| 2017 | -2.5 |

## Participation

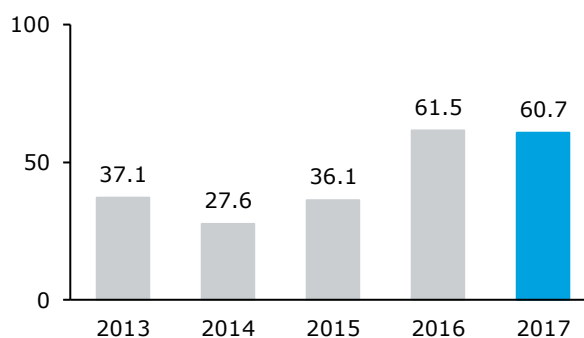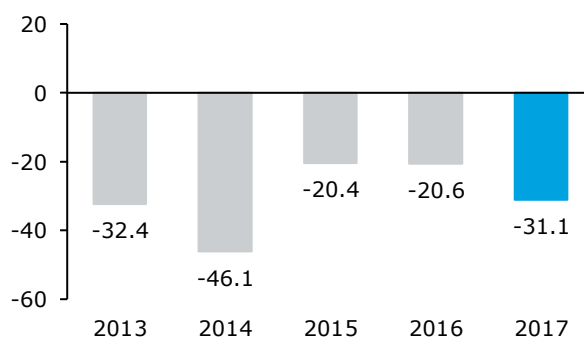| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 14 | 14 | 9 | 23 | **9** |
| Validated market share in unit terms | 24% | 21% | 17% | 50% | **27%** |
| Validated product forms | 749 | 627 | 448 | 1,238 | **364** |

## Actions

No action required from the statistical point of view

# Poland

## Precision (%)

Overall precision index declined slightly by 0.9 percentage points in 2017

Large product forms reached 96.6%, medium 93.7% and small 93.9%

Forms validated in both years, 2016 and 2017, improved by 1.4 percentage points to 97.8% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 97.3 | 97.1 | 95.6 | 96.2 | 95.3 |
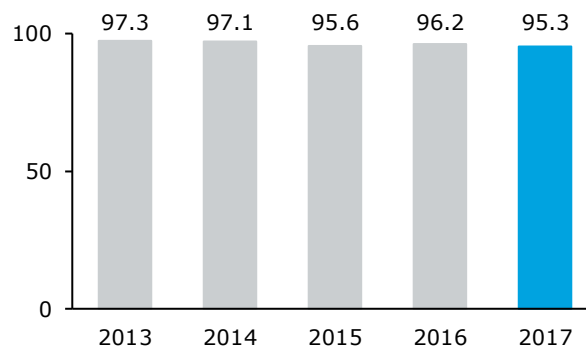
## Over/Underestimation (%)

Overall overestimation improved slightly by 0.7 percentage points in 2017

Large product forms were overestimated by 4.3%, medium by 1.4%, small were underestimated by 0.8%

Overestimation of forms validated in both years, 2016 and 2017, improved by 1.0 percentage point to 3.4% in 2017
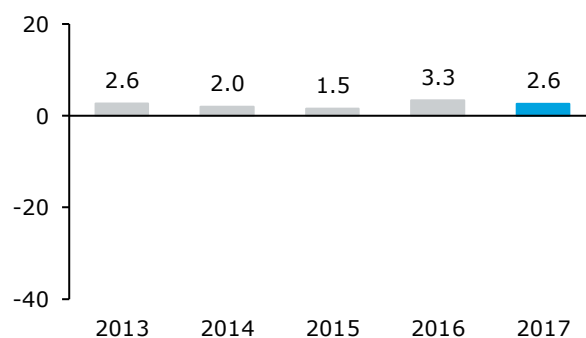
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 2.6 | 2.0 | 1.5 | 3.3 | 2.6 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 74 | 75 | 75 | 71 | **59** |
| Validated market share in unit terms | 30% | 34% | 41% | 37% | **30%** |
| Validated product forms | 1,139 | 1,301 | 1,678 | 1,509 | **1,257** |

## Actions

Review projection level

# Portugal

## Precision (%)

Overall precision index declined by 4.4 percentage points in 2017

Large product forms reached 96.1%, medium 90.8% and small 92.6%

Forms validated in both years, 2016 and 2017, declined by 1.7 percentage points to 97.0% in 2017
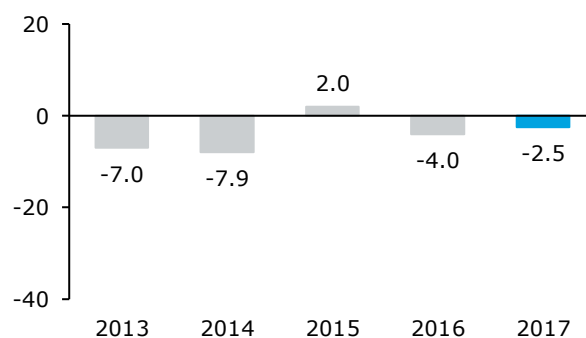
| Year | Value |
|------|-------|
| 2013 | 99.9 |
| 2014 | 100.0 |
| 2015 | 98.6 |
| 2016 | 98.3 |
| 2017 | 93.9 |
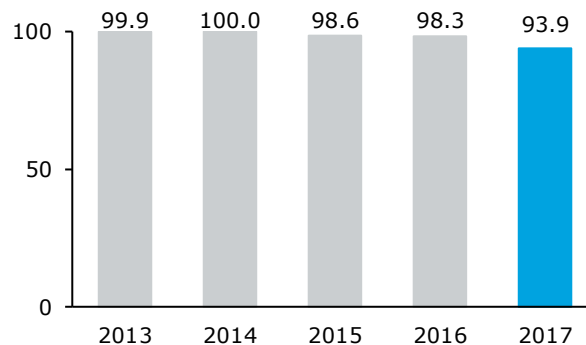
## Over/Underestimation (%)

Overall underestimation increased slightly by 0.8 percentage points in 2017

Large product forms were underestimated by 4.2%, medium by 5.2%, and small by 2.1%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.3 percentage points to 2.2% in 2017

| Year | Value |
|------|-------|
| 2013 | -2.8 |
| 2014 | -3.2 |
| 2015 | -4.6 |
| 2016 | -3.5 |
| 2017 | -4.3 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 20 | 18 | 17 | 13 | **10** |
| Validated market share in unit terms | 17% | 16% | 18% | 17% | **14%** |
| Validated product forms | 491 | 427 | 473 | 505 | **488** |

## Actions

No action required from the statistical point of view

**acts 2018**

# Russia

## Precision (%)

Overall precision index declined by 1.2 percent-age points in 2017

Large product forms reached 91.0%, medium 87.0% and small 79.9%

Forms validated in both years, 2016 and 2017, improved slightly by 0.1 percentage points to 89.4% in 2017

(Bar chart — Precision %)
- 2013: 87.3
- 2014: 86.3
- 2015: 88.7
- 2016: 89.2
- 2017: 88.0
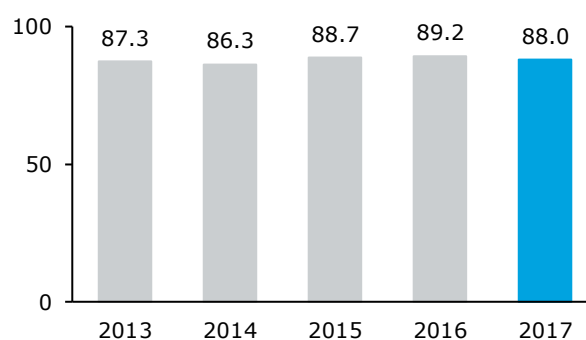
## Over/Underestimation (%)

Overall underestimation improved by 1.1 per-centage points in 2017

Large product forms were underestimated by 12.3%, medium by 10.3%, and small by 12.1%

Underestimation of forms validated in both years, 2016 and 2017, improved by 1.4 percentage points to 11.1% in 2017

(Bar chart — Over/Underestimation %)
- 2013: -14.6
- 2014: -16.7
- 2015: -9.1
- 2016: -12.8
- 2017: -11.7

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 65 | 70 | 97 | 98 | **102** |
| Validated market share in unit terms | 27% | 22% | 29% | 34% | **31%** |
| Validated product forms | 1,555 | 1,254 | 1,603 | 1,847 | **1,792** |

## Actions

Updating Universe

Recruiting new panels

Reviewing quality checks and algorithm of atypical sales detection

# Saudi Arabia

## Precision (%)

Overall precision index improved by 1.8 percentage points to a perfect 100% in 2017

All sales volume groups reached 100%

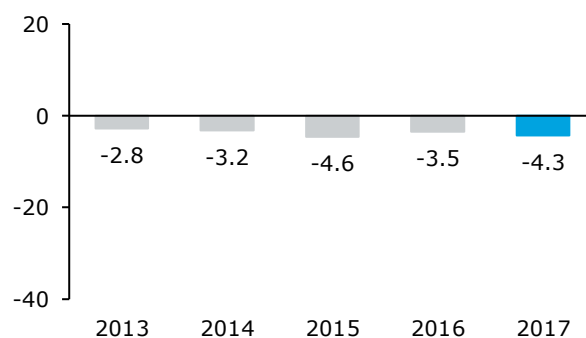Forms validated in both years, 2016 and 2017, improved by 1.6 percentage points to 100% in 2017
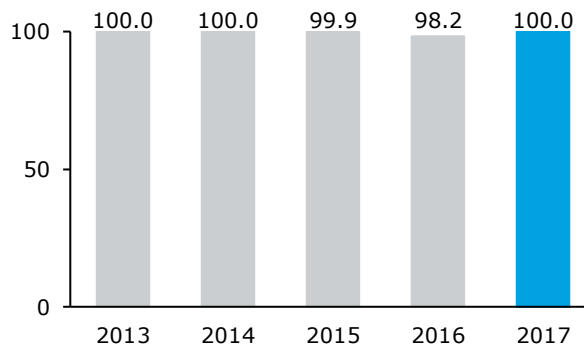


## Over/Underestimation (%)

Overall overestimation increased by 1.6 percentage points in 2017

Large product forms were overestimated by 2.1%, medium by 3.3%, and small by 3.7%

Overestimation of forms validated in both years, 2016 and 2017, increased by 1.7 percentage points to 2.6% in 2017
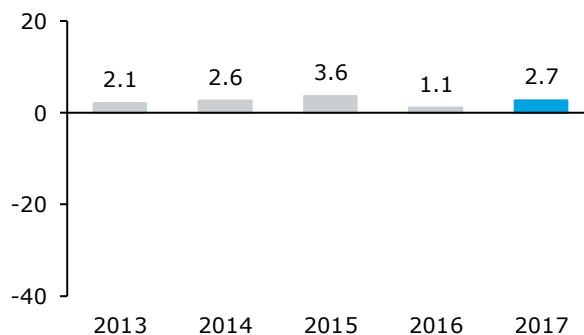


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 60 | 38 | 27 | 39 | **88** |
| Validated market share in unit terms | 65% | 49% | 32% | 26% | **71%** |
| Validated product forms | 917 | 661 | 481 | 481 | **1,080** |

## Actions

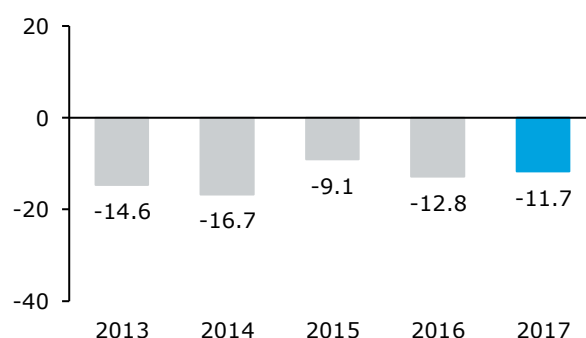No action required from the statistical point of view

# Serbia

**Retail+Hospital Validation Study**

## Precision (%)

Overall precision index declined by 3.9 percentage points in 2017

Large product forms reached 94.6%, medium 95.1% and small 92.3%

Forms validated in both years, 2016 and 2017, improved by 1.0 percentage point to 99.2% in 2017
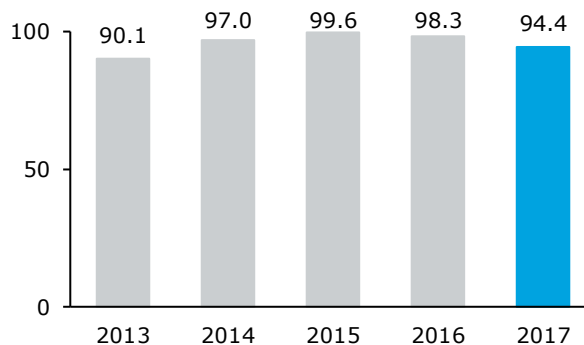
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 90.1 | 97.0 | 99.6 | 98.3 | 94.4 |

## Over/Underestimation (%)

Overall underestimation increased by 2.0 percentage points in 2017

Large product forms were underestimated by 2.8%, medium by 1.8%, and small by 2.2%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.3 percentage points to 0.9% in 2017
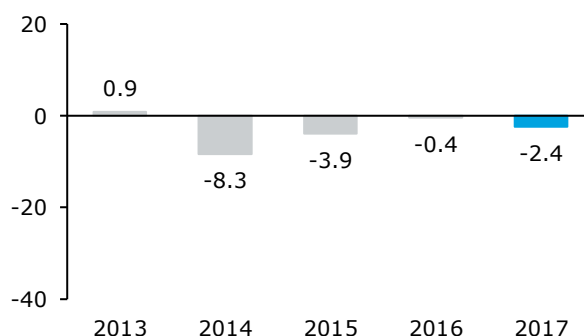
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 0.9 | -8.3 | -3.9 | -0.4 | -2.4 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 16 | 30 | 35 | 36 | **34** |
| Validated market share in unit terms | 56% | 67% | 68% | 63% | **76%** |
| Validated product forms | 456 | 609 | 626 | 680 | **548** |

## Actions

Analyze root cause for deteriorated results and evaluate corrective measures

Improve re-distribution algorithms

# Singapore

## Precision (%)

Overall precision index declined by 6.4 percentage points in 2017

Large product forms reached 67.0%, medium 72.7% and small 68.7%

| Year | Value |
|------|-------|
| 2013 | 77.7 |
| 2014 | 78.6 |
| 2015 | 76.3 |
| 2016 | 75.5 |
| 2017 | 69.1 |
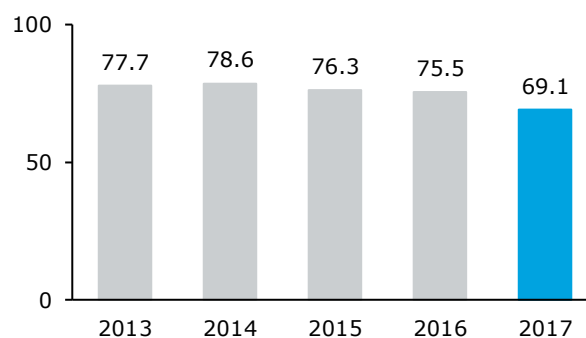
## Over/Underestimation (%)

Overall underestimation improved by 5.6 percentage points in 2017

Large product forms were underestimated by 4.5%, medium by 3.1%, and small by 5.1%
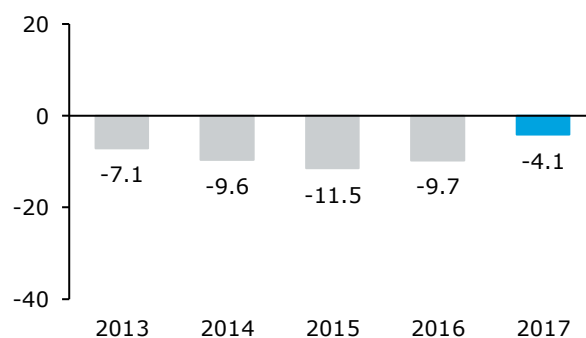
| Year | Value |
|------|-------|
| 2013 | -7.1 |
| 2014 | -9.6 |
| 2015 | -11.5 |
| 2016 | -9.7 |
| 2017 | -4.1 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 51 | 54 | 63 | 61 | **69** |
| Validated market share in unit terms | 40% | 34% | 30% | 25% | **38%** |
| Validated product forms | 2,392 | 2,382 | 2,276 | 1,971 | **2,124** |

## Actions

New pharmacy panel onboarding in 2018

Review panel composition

# Slovak Republic

## Precision (%)

Overall precision index improved by 1.2 percentage points in 2017

Large and medium product forms both reached a perfect 100%, small forms reached 96.0%

Forms validated in both years, 2016 and 2017, improved by 1.0 percentage point to 99.4% in 2017
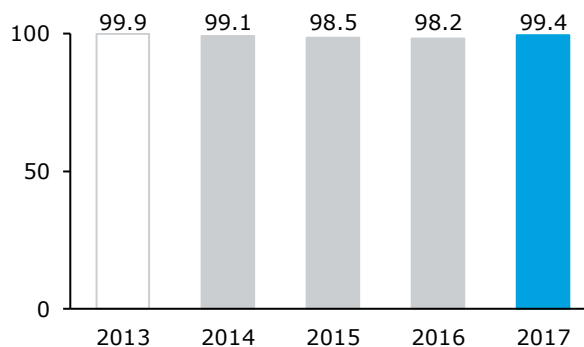
| Year | Value |
|------|-------|
| 2013 | 99.9 |
| 2014 | 99.1 |
| 2015 | 98.5 |
| 2016 | 98.2 |
| 2017 | 99.4 |

## Over/Underestimation (%)

Overall underestimation improved slightly by 0.8 percentage points in 2017

Large product forms were underestimated by 0.2%, medium by 0.1%, small overestimated by 0.8%

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.9 percentage points to 0.2% in 2017

| Year | Value |
|------|-------|
| 2013 | -1.2 |
| 2014 | -1.7 |
| 2015 | -2.2 |
| 2016 | -0.9 |
| 2017 | -0.1 |
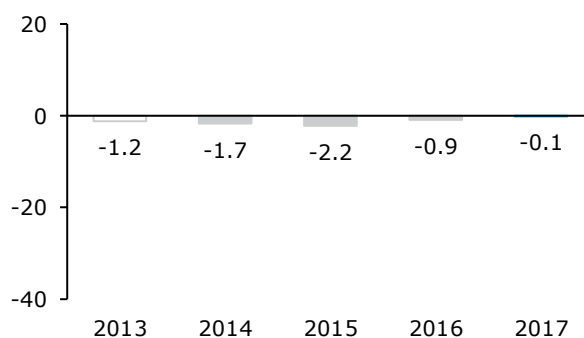
## Participation

|                                      | 2013 | 2014 | 2015 | 2016 | 2017 |
|--------------------------------------|------|------|------|------|------|
| Participating companies              | 16   | 17   | 12   | 19   | **19** |
| Validated market share in unit terms | 8%   | 27%  | 30%  | 27%  | **36%** |
| Validated product forms              | 252  | 443  | 498  | 432  | **701** |

## Actions

No action required from the statistical point of view

# Slovenia

## Precision (%)

Overall precision index declined slightly by 0.1 percentage points in 2017

Medium product forms reached 97.7% and small 98.8%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined slightly by 0.8 percentage points to 97.8% in 2017
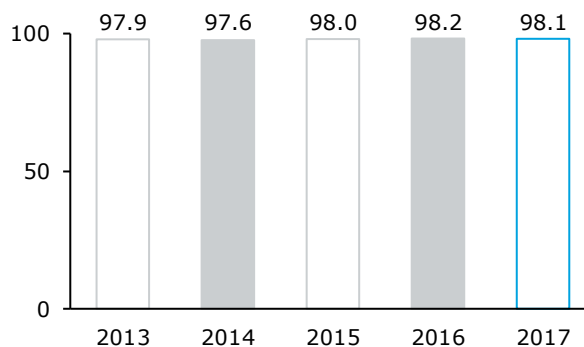


## Over/Underestimation (%)

Overall underestimation increased slightly by 0.4 percentage points in 2017

Medium product forms were underestimated by 2.7%, and small by 1.8%. A minor number of large product forms were grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, increased by 1.1 percentage points to 2.1% in 2017
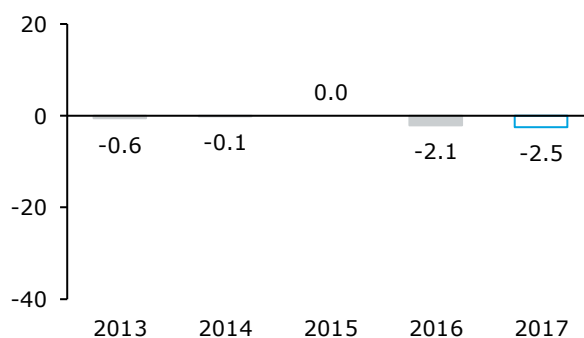


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 7 | 11 | 6 | 10 | **7** |
| Validated market share in unit terms | 5% | 30% | 6% | 10% | **6%** |
| Validated product forms | 95 | 356 | 103 | 223 | **129** |

## Actions

Motivate more clients to participate in the validation study

# South Africa

## Precision (%)

Overall precision index declined by 6.0 percentage points in 2017

Large product forms reached 96.2%, medium 92.8% and small 89.3%

Forms validated in both years, 2016 and 2017, declined by 7.1 percentage points to 92.9% in 2017
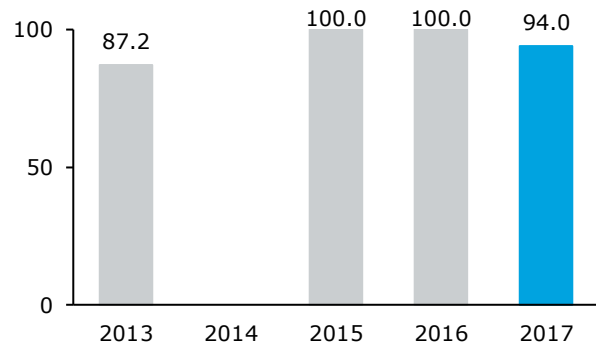


## Over/Underestimation (%)

Overall bias turned from 2.4% overestimation to 3.3% underestimation in 2017

Large product forms were underestimated by 3.3%, medium by 3.8%, and small by 2.3%

Overall bias of forms validated in both years, 2016 and 2017, turned from 1.5% overestimation to 5.6% underestimation in 2017
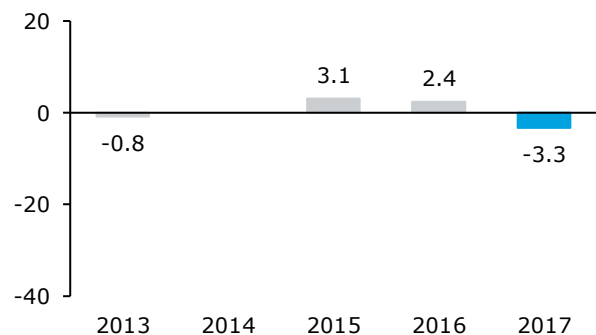


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 29 | | 17 | 14 | **24** |
| Validated market share in unit terms | 13% | | 31% | 19% | **22%** |
| Validated product forms | 627 | | 790 | 672 | **1,032** |

## Actions

Investigate quality of input data

# South Korea

## Precision (%)

Overall precision index improved by 1.5 percentage points in 2017

Large product forms reached 91.3%, medium 90.8% and small 84.9%

Forms validated in both years, 2016 and 2017, improved slightly by 0.3 percentage points to 96.0% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 84.1 | 88.1 | 87.0 | 88.6 | 90.1 |
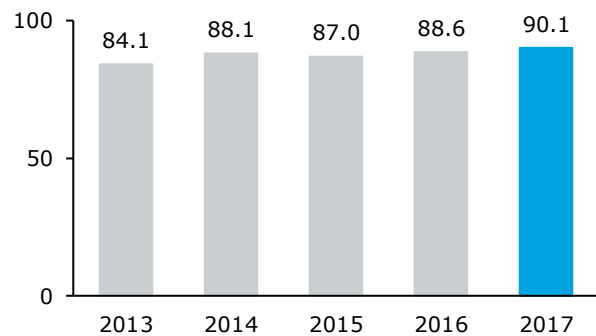
## Over/Underestimation (%)

Overall underestimation improved by 5.0 percentage points in 2017

Large product forms were underestimated by 8.5%, medium by 5.0%, and small by 8.0%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.6 percentage points to 8.4% in 2017
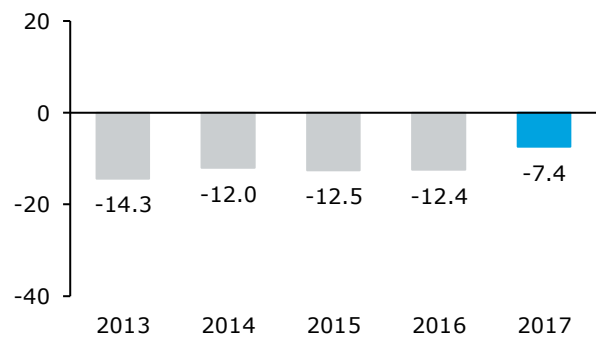
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -14.3 | -12.0 | -12.5 | -12.4 | -7.4 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 12 | 19 | 13 | 14 | **12** |
| Validated market share in unit terms | 18% | 12% | 12% | 10% | **10%** |
| Validated product forms | 734 | 770 | 795 | 539 | **442** |

## Actions

Review projection level and panel composition

Check completeness and accuracy of panel data and replace inadequate panel

# Spain

## Precision (%)

Overall precision index improved slightly by 0.5 percentage points in 2017

Large product forms reached 97.4%, medium 94.3% and small 93.3%

Forms validated in both years, 2016 and 2017, improved by 1.6 percentage points to 98.7% in 2017

| Year | Value |
|------|-------|
| 2013 | 97.0 |
| 2014 | 91.9 |
| 2015 | 95.6 |
| 2016 | 95.3 |
| 2017 | 95.8 |
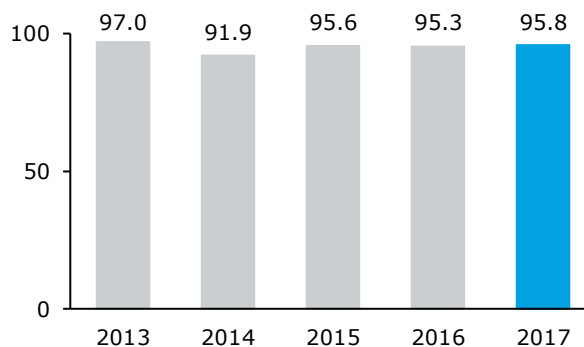
## Over/Underestimation (%)

Overall overestimation improved by 2.5 percentage points in 2017

Large product forms were underestimated by 0.3%, medium were overestimated by 1.2%, small were underestimated by 1.6%

Overestimation of forms validated in both years, 2016 and 2017, improved by 3.3 percentage points to 3.2% in 2017

| Year | Value |
|------|-------|
| 2013 | -0.9 |
| 2014 | -4.0 |
| 2015 | -1.0 |
| 2016 | 2.6 |
| 2017 | 0.1 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 15 | 17 | 19 | 18 | **18** |
| Validated market share in unit terms | 14% | 17% | 21% | 16% | **12%** |
| Validated product forms | 548 | 635 | 746 | 611 | **509** |

## Actions

No action required from the statistical point of view

# Sri Lanka

## Precision (%)

Overall precision index improved by 7.6 percentage points in 2017

Large product forms reached 84.0%, medium 64.4% and small 51.9%

Forms validated in both years, 2016 and 2017, improved by 9.0 percentage points to 71.9% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | | | 63.9 | 65.1 | 72.7 |
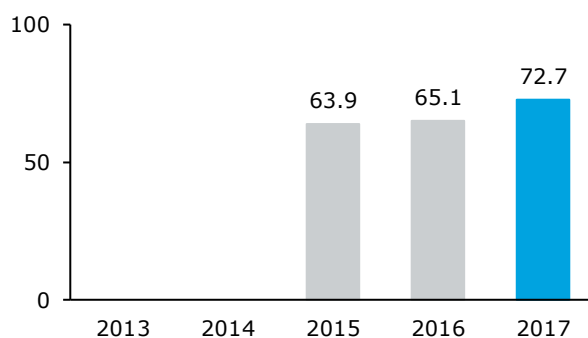
## Over/Underestimation (%)

Overall underestimation increased by 6.7 percentage points in 2017

Large product forms were underestimated by 23.8%, medium by 27.7%, and small by 28.6%

Underestimation of forms validated in both years, 2016 and 2017, increased by 5.7 percentage points to 25.6% in 2017
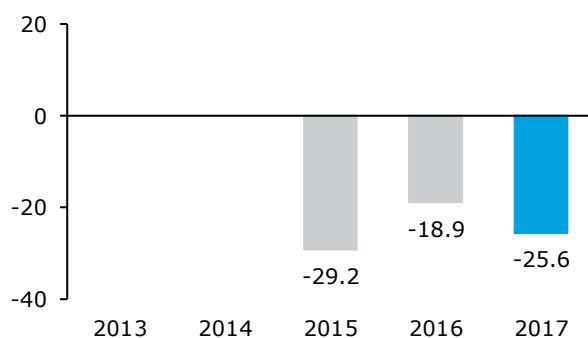
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | | | -29.2 | -18.9 | -25.6 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | | | 10 | 52 | **41** |
| Validated market share in unit terms | | | 10% | 42% | **38%** |
| Validated product forms | | | 196 | 776 | **706** |

## Actions

Implement new census data

# Switzerland

## Precision (%)

Overall precision index declined slightly by 0.8 percentage points in 2017

Large product forms reached 99.1%, medium 98.7% and small 98.2%

Forms validated in both years, 2016 and 2017, improved slightly by 0.2 percentage points to 99.8% in 2017

Precision (%) chart:

| Year | Value |
|------|-------|
| 2013 | 99.6 |
| 2014 | 99.6 |
| 2015 | 99.6 |
| 2016 | 99.6 |
| 2017 | 98.8 |

## Over/Underestimation (%)

Overall bias turned from no bias to 1.0% underestimation in 2017

Large product forms were underestimated by 0.8%, medium by 1.1%, and small by 1.3%

Overall bias of forms validated in both years, 2016 and 2017, turned from no bias to 0.8% underestimation in 2017

Over/Underestimation (%) chart:

| Year | Value |
|------|-------|
| 2013 | -1.0 |
| 2014 | -1.1 |
| 2015 | 0.0 |
| 2016 | 0.0 |
| 2017 | -1.0 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 26 | 17 | 48 | 38 | **39** |
| Validated market share in unit terms | 27% | 9% | 43% | 45% | **38%** |
| Validated product forms | 1,280 | 591 | 2,019 | 1,914 | **1,692** |

## Actions

No action required from the statistical point of view

# Thailand

## Precision (%)

Overall precision index improved slightly by 0.6 percentage points in 2017

Large product forms reached 93.4%, medium 89.3% and small 85.7%

Chart: Precision (%)
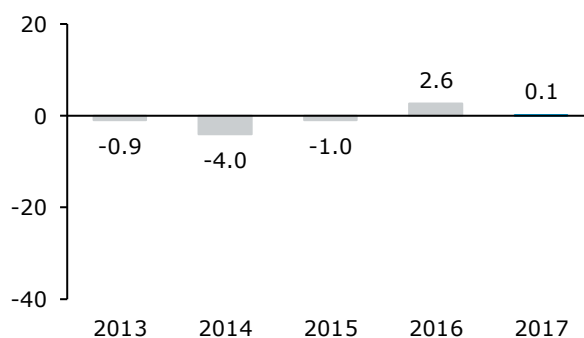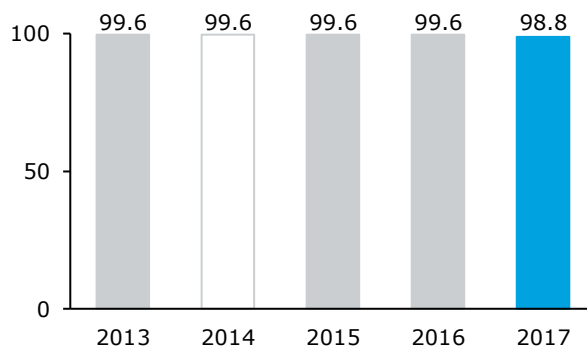| Year | Value |
|------|-------|
| 2013 | 88.8 |
| 2014 | 88.9 |
| 2015 | 89.2 |
| 2016 | 90.3 |
| 2017 | 90.9 |
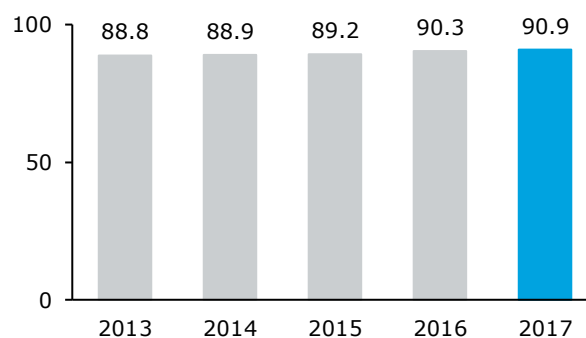
## Over/Underestimation (%)

Overall underestimation increased by 4.4 percentage points in 2017

Large product forms were underestimated by 5.2%, medium by 7.6% and small by 7.9%
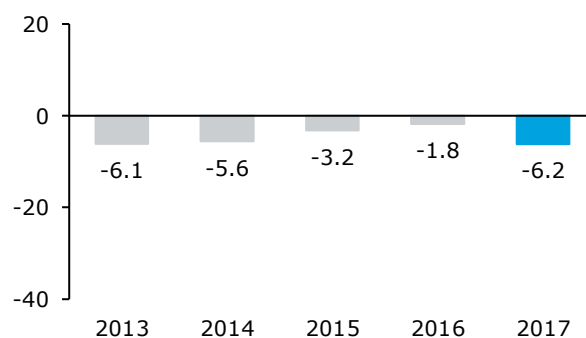
Chart: Over/Underestimation (%)
| Year | Value |
|------|-------|
| 2013 | -6.1 |
| 2014 | -5.6 |
| 2015 | -3.2 |
| 2016 | -1.8 |
| 2017 | -6.2 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 46 | 43 | 46 | 46 | **45** |
| Validated market share in unit terms | 37% | 34% | 35% | 34% | **34%** |
| Validated product forms | 1,063 | 983 | 996 | 1,018 | **1,026** |

## Actions

Enhance projection methodology

Onboard new chain panel

# Turkey

## Precision (%)

Overall precision index remained unchanged in 2017

Large product forms reached a perfect 100%, medium 99.8% and small 99.8%

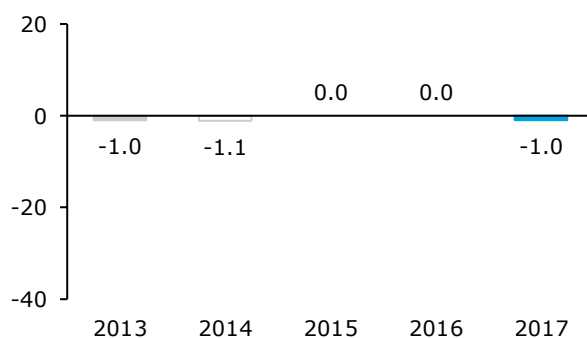Forms validated in both years, 2016 and 2017, declined slightly by 0.1 percentage points to 99.9% in 2017

Bar chart — Precision (%):
- 2013: 99.9
- 2014: 100.0
- 2015: 99.7
- 2016: 99.9
- 2017: 99.9
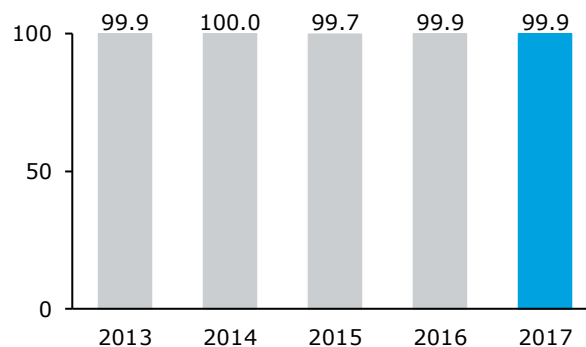
## Over/Underestimation (%)

Overall underestimation increased slightly by 0.5 percentage points in 2017

Large product forms were underestimated by 2.5%, medium by 2.4%, and small by 2.6%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.9 percentage points to 2.6% in 2017

Bar chart — Over/Underestimation (%):
- 2013: 0.5
- 2014: -2.1
- 2015: -0.2
- 2016: -2.0
- 2017: -2.5
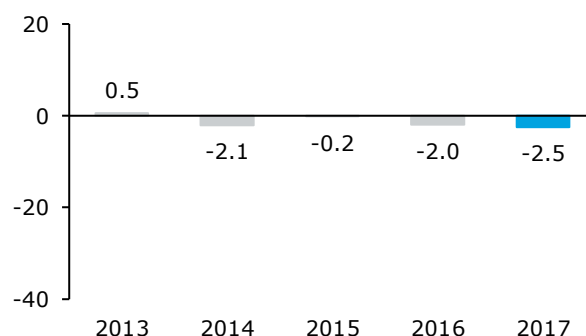
## Participation

| Participation | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 42 | 60 | 68 | 64 | **79** |
| Validated market share in unit terms | 35% | 47% | 51% | 46% | **60%** |
| Validated product forms | 847 | 1,005 | 1,207 | 1,023 | **1,476** |

## Actions

No action required from the statistical point of view

# United Arab Emirates

## Precision (%)

Overall precision index declined slightly by 0.1 percentage points in 2017

Large and medium product forms both reached a perfect 100%, small forms reached 99.0%

Forms validated in both years, 2016 and 2017, declined slightly by 0.3 percentage points to 99.7% in 2017
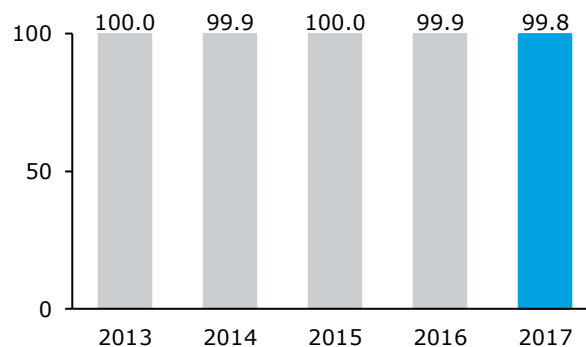
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 100.0 | 99.9 | 100.0 | 99.9 | 99.8 |

## Over/Underestimation (%)

Overall underestimation increased slightly by 0.3 percentage points in 2017

Large product forms were underestimated by 0.5%, medium by 0.5%, and small by 0.2%

Underestimation of forms validated in both years, 2016 and 2017, remained unchanged at 0.1% in 2017
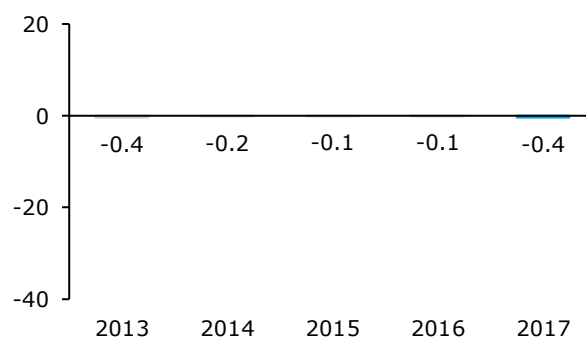
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -0.4 | -0.2 | -0.1 | -0.1 | -0.4 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 43 | 26 | 19 | 20 | **25** |
| Validated market share in unit terms | 70% | 35% | 20% | 19% | **41%** |
| Validated product forms | 1,019 | 651 | 420 | 428 | **725** |

## Actions

No action required from the statistical point of view

# United Kingdom

## Precision (%)

Overall precision index declined slightly by 0.1 percentage points in 2017

Large product forms reached a perfect 100%, medium 99.2% and small 100%
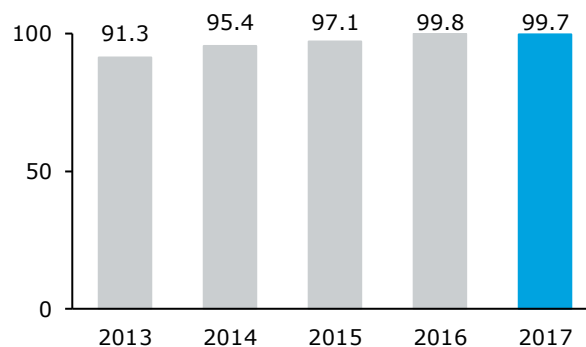


## Over/Underestimation (%)

Overall overestimation improved slightly by 0.9 percentage points in 2017

Large product forms were overestimated by 0.6%, medium by 2.0%, and small by 0.1%
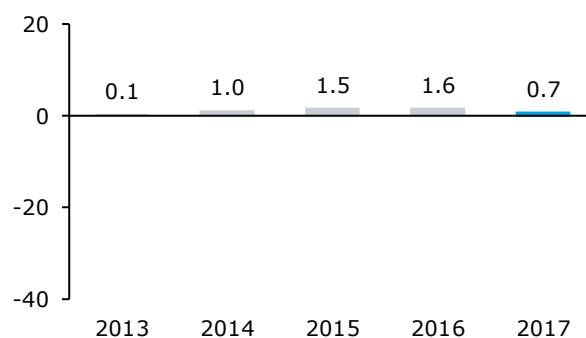


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 85 | 42 | 43 | 65 | **48** |
| Validated market share in unit terms | 29% | 13% | 14% | 17% | **19%** |
| Validated product forms | 638 | 318 | 301 | 347 | **272** |

## Actions

No action required from the statistical point of view

# Uruguay

## Precision (%)

Overall precision index improved by 2.9 percentage points in 2017

Large product forms reached 89.8%, medium 85.3% and small 79.3%

Forms validated in both years, 2016 and 2017, improved by 2.7 percentage points to 88.9% in 2017

| Year | Value |
|------|-------|
| 2013 | 69.0 |
| 2014 | 72.8 |
| 2015 | 76.3 |
| 2016 | 83.8 |
| 2017 | 86.7 |
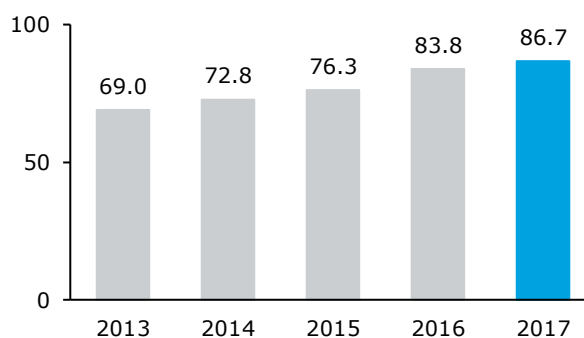
## Over/Underestimation (%)

Overall underestimation improved by 1.9 percentage points in 2017

Large product forms were overestimated by 0.4%, medium were underestimated by 3.4%, and small by 5.7%

Underestimation of forms validated in both years, 2016 and 2017, improved by 2.5 percentage points to 0.6% in 2017

| Year | Value |
|------|-------|
| 2013 | -5.5 |
| 2014 | -4.3 |
| 2015 | -2.3 |
| 2016 | -3.0 |
| 2017 | -1.1 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|
| Participating companies | 19 | 18 | 12 | 18 | **7** |
| Validated market share in unit terms | 53% | 57% | 43% | 62% | **38%** |
| Validated product forms | 1,257 | 1,271 | 1,005 | 1,220 | **623** |

## Actions

Increase mutuales panel

Motivate more companies to participate in the validation study

## Precision (%)

Overall precision index declined slightly by 0.8 percentage points in 2017

Medium product forms reached 97.4% and small 92.4%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, improved by 1.8 percentage points to 96.7% in 2017
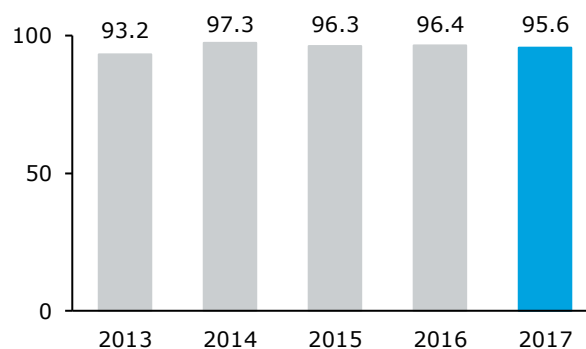


## Over/Underestimation (%)

Overall underestimation increased by 5.2 percentage points in 2017

Medium product forms were underestimated by 12.3%, and small by 9.1%. A minor number of large product forms were grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, increased by 4.4 percentage points to 11.7% in 2017



## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 60 | 66 | 60 | 60 | **53** |
| Validated market share* in value terms | | 88% | 78% | 78% | **73%** |
| Validated product forms | 1,099 | 1,062 | 1,014 | 1,052 | **877** |

## Actions

Precision results remain consistent with prior year. The decline in bias is explained by the removal of hospital panel volumes that to date have been off-setting a lower, more accurate overall bias result that has existed in NSP since 2013 when the US Federal Accounts primary wholesaler began blocking sales to IQVIA.

* The validated market refers to branded prescription products

# Venezuela

## Precision (%)

Overall precision index declined by 3.1 percentage points in 2017

Large product forms reached 88.7%, medium 91.9% and small 88.0%

Forms validated in both years, 2016 and 2017, declined by 1.9 percentage points to 93.2% in 2017
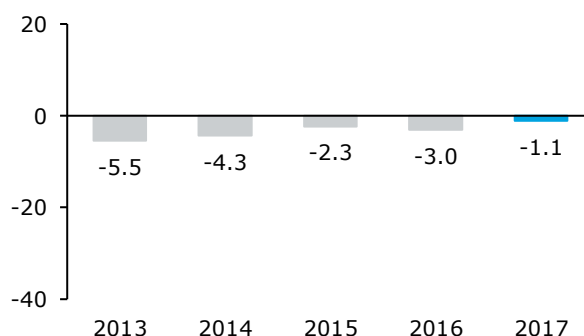
**Precision (%) chart**

| Year | Value |
|------|-------|
| 2013 | 93.8 |
| 2014 | 89.6 |
| 2015 | 87.2 |
| 2016 | 92.7 |
| 2017 | 89.6 |
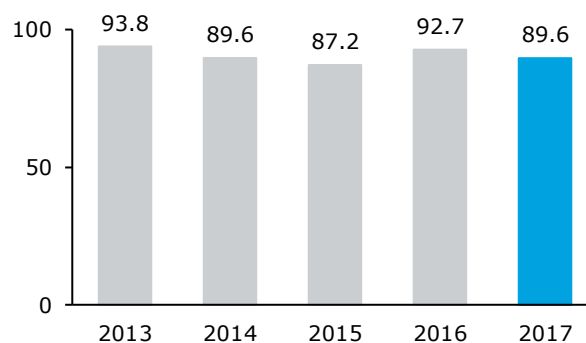
## Over/Underestimation (%)

Overall underestimation improved by 3.7 percentage points in 2017

Large product forms were overestimated by 2.6%, medium were underestimated by 3.7%, and small by 11.1%

Underestimation of forms validated in both years, 2016 and 2017, improved by 2.3 percentage points to 4.0% in 2017
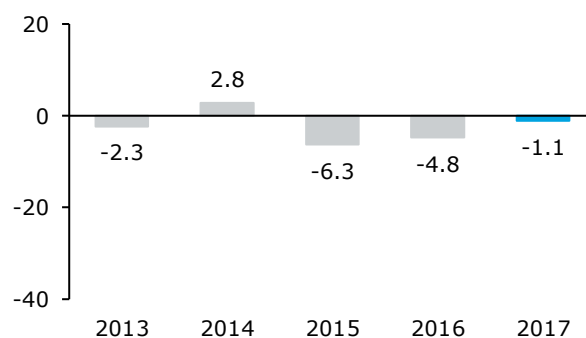
**Over/Underestimation (%) chart**

| Year | Value |
|------|-------|
| 2013 | -2.3 |
| 2014 | 2.8 |
| 2015 | -6.3 |
| 2016 | -4.8 |
| 2017 | -1.1 |

## Participation

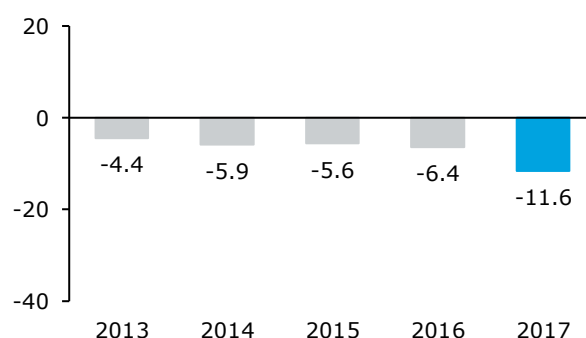| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 48 | 37 | 32 | 27 | **17** |
| Validated market share in unit terms | 57% | 39% | 41% | 49% | **29%** |
| Validated product forms | 1,504 | 1,160 | 1,002 | 761 | **360** |

## Actions

No action required from the statistical point of view

# Vietnam

## Precision (%)

Overall precision index improved by 1.8 percentage points in 2017

Large product forms reached 70.8%, medium 56.7% and small 43.3%

Forms validated in both years, 2016 and 2017, declined by 5.2 percentage points to 60.8% in 2017
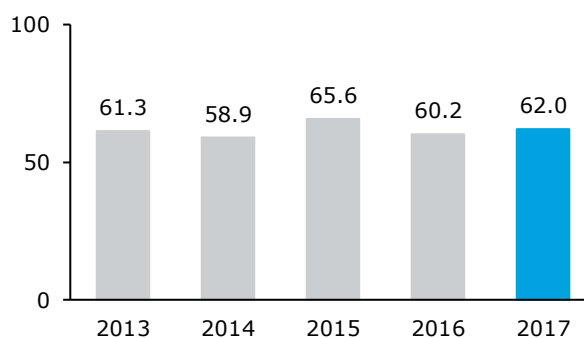
| Year | Value |
|------|-------|
| 2013 | 61.3 |
| 2014 | 58.9 |
| 2015 | 65.6 |
| 2016 | 60.2 |
| 2017 | 62.0 |

## Over/Underestimation (%)

Overall underestimation increased by 5.2 percentage points in 2017

Large product forms were underestimated by 36.8%, medium by 38.8% and small by 39.8%

Underestimation of forms validated in both years, 2016 and 2017, increased by 4.8 percentage points to 37.4% in 2017
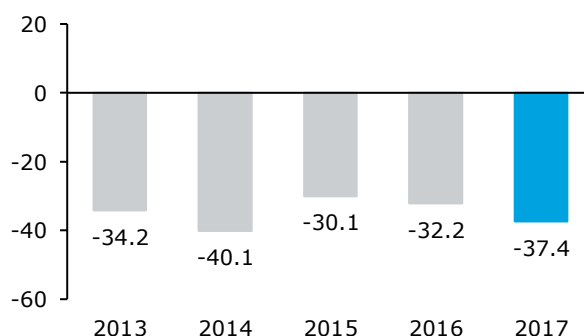
| Year | Value |
|------|-------|
| 2013 | -34.2 |
| 2014 | -40.1 |
| 2015 | -30.1 |
| 2016 | -32.2 |
| 2017 | -37.4 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 53 | 60 | 30 | 51 | **28** |
| Validated market share in unit terms | 11% | 13% | 10% | 14% | **10%** |
| Validated product forms | 661 | 736 | 597 | 560 | **447** |

## Actions

Improve data quality

Review panel composition

Conduct census to review pharmacy channel universe

## OTC Validation Studies

Given the increasing importance of Over-The-Counter (OTC) markets, we regularly evaluate our accuracy measures for OTC products that are sub-groupings of the standard national retail or PharmaTrend services. These "sub-validations" are made possible simply by restricting the national standard validation analysis for a clearly defined subset of products. Due to their small prescription share, these pro-ducts typically follow distinct distribution routes, and their consumption is more customer-driven than that of prescription-bound products. As a general rule, we find that a higher proportion of these products are sold directly from manufacturer to retail outlet so that IQVIA retail pharmacy samples have a higher impact on our ultimate audit estimates.

### Global OTC Validation Results

While in previous years we focused exclusively on IQVIA sell-in services as part of our retail services portfolio, since the 2013 ACTS report we are now including also sell-out services in countries where they have become our standard OTC deliverable. For that purpose, five years of data got re-evaluated and summary statistics in this ACTS report are now a mix of metrics originating from either sell-in or sell-out services.

For the 2017 OTC validation studies, 17 countries provided analysable results. No validation study was necessary in *Norway* as we collect full census data in this country. There, precision results are assumed to be 100 percent. This makes a total of 18 sets of validation results, of which 15 had uninterrupted five-year results. The overall degree of precision in the OTC reports is best described by an aggregated precision index for these 15 countries:

*OTC Precision Index (%)*
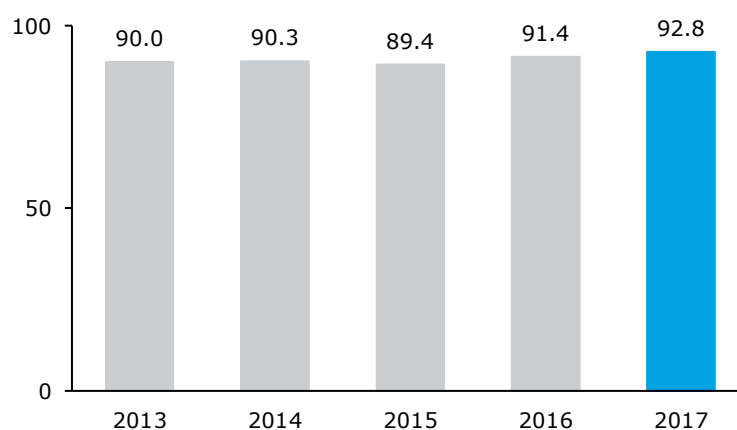


The world-wide OTC precision index improved by 1.4 percentage points, from 91.4% in 2016 to 92.8% in 2017, demonstrating high-level accuracy well above 90% in the last two years.

## Improvement & Deterioration

| Country | Improvement | |
| --- | --- | --- |
| | Precision 2017 % | Change vs. 2016 %p |
| Argentina | 89.7 | +10.7 |
| Canada | 100.0 | +3.8 |
| Mexico | 92.5 | +3.6 |
| South Korea | 83.3 | +17.4 |

| Country | Deterioration | |
| --- | --- | --- |
| | Precision 2017 % | Change vs. 2016 %p |
| Bulgaria | 80.5 | -12.5 |
| Greece | 81.4 | -9.2 |
| Poland | 75.4 | -6.1 |
| Venezuela | 90.7 | -3.0 |

Four countries demonstrated significant improvement of more than 2 percentage points over 2016. Remarkable growth of 17.4 percentage points is reported for *South Korea*, followed by Argentina (10.7) and Canada (3.8). Four countries declined by more than 2 percentage points in 2017, most significantly *Bulgaria* by 12.5 percentage points.

## OTC Validation Results by Country

The validation studies mentioned on the subsequent country pages refer to the IQVIA OTC reports.

# Argentina

## Precision (%)

Overall precision index improved by 10.7 percentage points in 2017

Large product forms reached 93.5%, medium 84.9% and small 86.8%

Forms validated in both years, 2016 and 2017, declined by 1.1 percentage points to 85.6% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 84.7 | 83.1 | 74.9 | 79.0 | 89.7 |
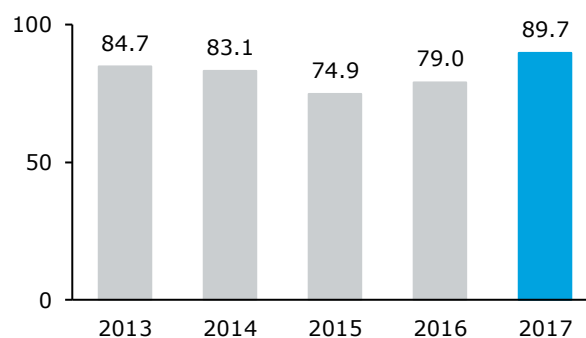
## Over/Underestimation (%)

Overall underestimation improved by 11.8 percentage points in 2017

Large product forms were underestimated by 2.4%, medium by 6.9% and small by 7.9%

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.4 percentage points to 6.1% in 2017
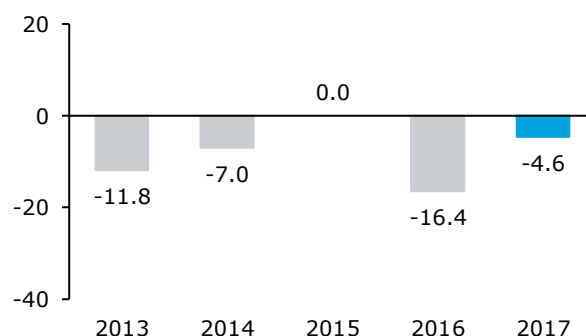
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -11.8 | -7.0 | 0.0 | -16.4 | -4.6 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 37 | 40 | 20 | 24 | **25** |
| Validated market share in unit terms | 46% | 47% | 16% | 27% | **21%** |
| Validated product forms | 360 | 431 | 156 | 230 | **215** |

## Actions

Include OTC-oriented wholesaler in panel

# Austria

## Precision (%)

Overall precision index declined slightly by 0.2 percentage points in 2017

Large product forms reached 88.7%, medium 90.1% and small 88.5%

Forms validated in both years, 2016 and 2017, declined slightly by 0.4 percentage points to 88.9% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 87.7 | 88.4 | 89.0 | 89.3 | 89.1 |
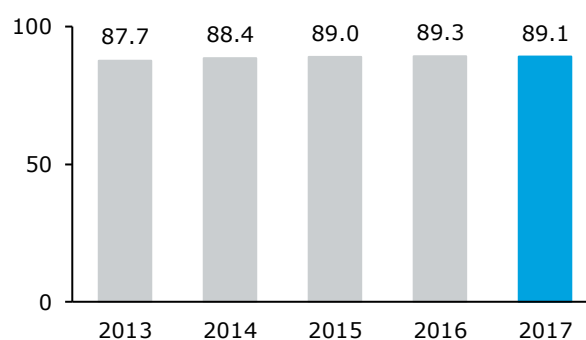
## Over/Underestimation (%)

Overall underestimation increased by 2.2 percentage points in 2017

Large product forms were underestimated by 5.3%, medium by 9.2% and small by 11.9%

Underestimation of forms validated in both years, 2016 and 2017, increased by 2.0 percentage points to 6.8% in 2017
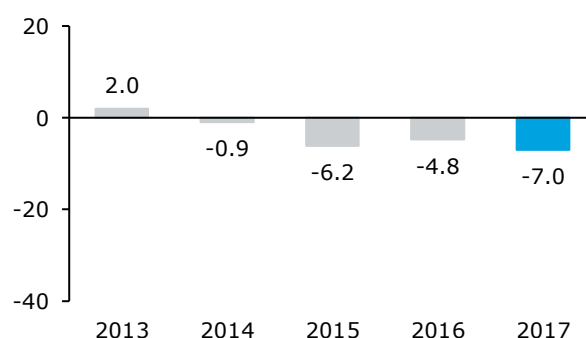
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 2.0 | -0.9 | -6.2 | -4.8 | -7.0 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 86 | 86 | 87 | 85 | **85** |
| Validated market share in unit terms | 92% | 90% | 89% | 92% | **90%** |
| Validated product forms | 507 | 509 | 505 | 519 | **513** |

## Actions

Review projection level

# Bulgaria

## Precision (%)

Overall precision index declined by 12.5 percentage points in 2017

Medium product forms reached 85.1% and small 72.7%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 14.2 percentage points to 80.9% in 2017
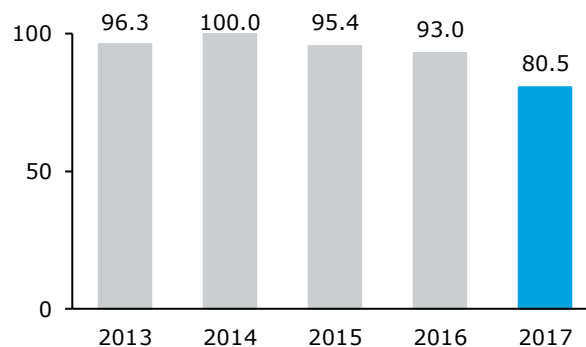
Precision chart (%):
- 2013: 96.3
- 2014: 100.0
- 2015: 95.4
- 2016: 93.0
- 2017: 80.5

## Over/Underestimation (%)

Overall underestimation improved slightly by 0.3 percentage points in 2017

Medium product forms were underestimated by 1.1% and small by 4.4%. A minor number of large product forms were grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.6 percentage points to 3.3% in 2017

Over/Underestimation chart (%):
- 2013: 3.4
- 2014: 1.1
- 2015: 0.0
- 2016: -1.7
- 2017: -1.4

## Participation

| Participation | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 31 | 24 | 13 | 15 | **27** |
| Validated market share in unit terms | 56% | 44% | 29% | 19% | **28%** |
| Validated product forms | 155 | 151 | 78 | 101 | **149** |

## Actions

Analyze company level validation results

# Canada

## Precision (%)

Overall precision index improved by 3.8 percentage points to a perfect 100% in 2017

Large and medium product forms both reached 100%, small forms reached 99.8%

Forms validated in both years, 2016 and 2017, improved by 4.1 percentage points to 100% in 2017
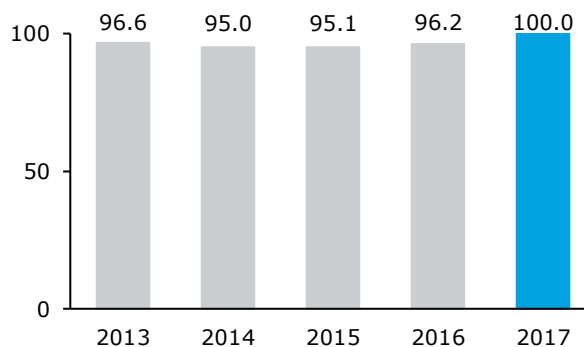
| Year | Value |
|------|-------|
| 2013 | 96.6 |
| 2014 | 95.0 |
| 2015 | 95.1 |
| 2016 | 96.2 |
| 2017 | 100.0 |

## Over/Underestimation (%)

Overall overestimation increased slightly by 0.4 percentage points in 2017

Large product forms were overestimated by 1.1%, medium by 2.0%, and small by 1.1%

Overestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.8 percentage points to 0.4% in 2017

| Year | Value |
|------|-------|
| 2013 | 0.9 |
| 2014 | 1.1 |
| 2015 | 0.8 |
| 2016 | 1.0 |
| 2017 | 1.4 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 53 | 56 | 60 | 67 | **164** |
| Validated market share in unit terms | 95% | 95% | 95% | 95% | **95%** |
| Validated product forms | 909 | 874 | 923 | 965 | **3,185** |

## Actions

No action required from the statistical point of view

# Czech Republic

## Precision (%)

Overall precision index declined by 2.0 percentage points in 2017

Large product forms reached 96.8%, medium 93.0% and small 88.4%

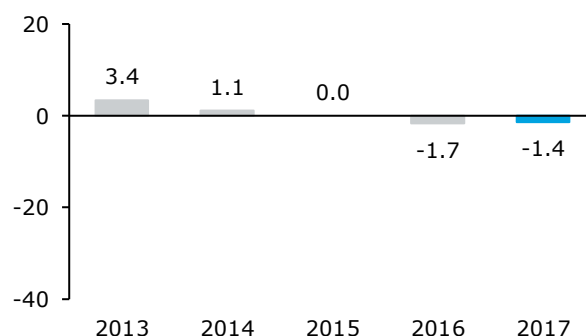Forms validated in both years, 2016 and 2017, improved slightly by 0.2 percentage points to 98.3% in 2017
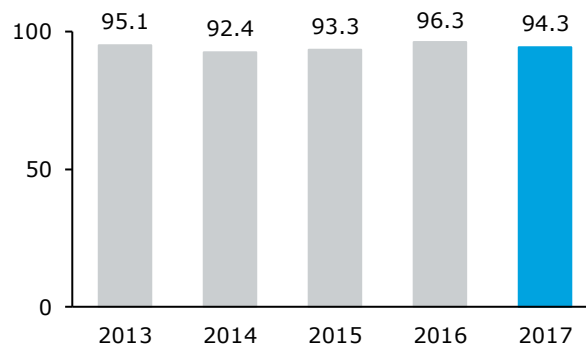


## Over/Underestimation (%)

Overall underestimation increased by 2.4 percentage points in 2017

Large product forms were underestimated by 7.4%, medium by 6.9%, and small by 7.6%

Underestimation of forms validated in both years, 2016 and 2017, increased by 1.7 percentage points to 6.6% in 2017
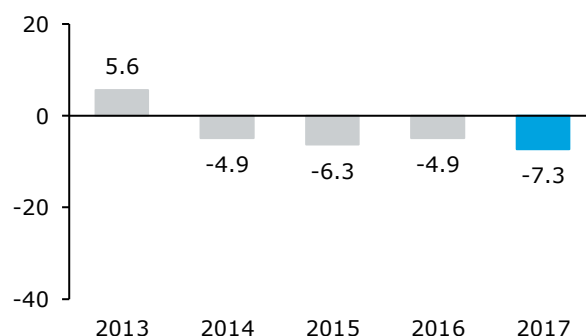


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 15 | 20 | 15 | 11 | **13** |
| Validated market share in unit terms | 51% | 43% | 47% | 44% | **45%** |
| Validated product forms | 213 | 211 | 213 | 200 | **192** |

## Actions

Review projection level and panel composition

# Germany

## Precision (%)

Overall precision index declined slightly by 0.2 percentage points in 2017

Large product forms reached 95.7%, medium 96.3% and small 93.5%

Forms validated in both years, 2016 and 2017, declined slightly by 0.7 percentage points to 96.4% in 2017
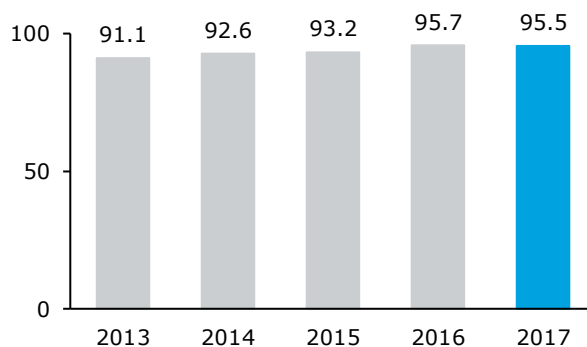
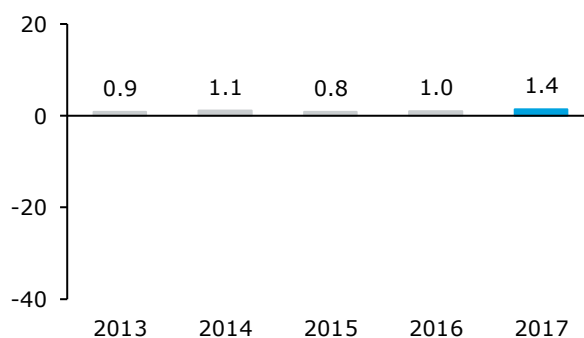| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 91.1 | 92.6 | 93.2 | 95.7 | 95.5 |

## Over/Underestimation (%)

Overall overestimation improved slightly by 0.4 percentage points in 2017

Large product forms were overestimated by 0.4%, medium by 0.6%, and small by 1.9%

Overestimation of forms validated in both years, 2016 and 2017, improved by 1.0 percentage point to 0.8% in 2017
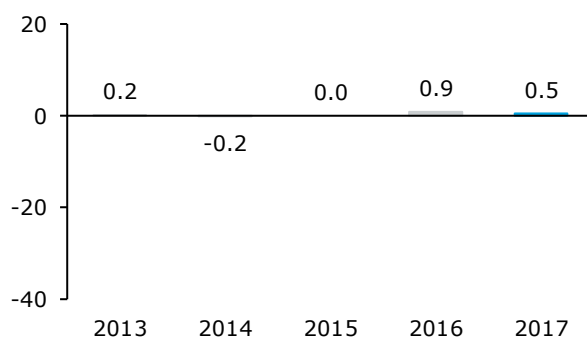
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 0.2 | -0.2 | 0.0 | 0.9 | 0.5 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 23 | 23 | 25 | 20 | **19** |
| Validated market share in unit terms | 33% | 33% | 30% | 27% | **28%** |
| Validated product forms | 684 | 690 | 690 | 591 | **597** |

## Actions

No action required from the statistical point of view

## Precision (%)

Overall precision index declined by 9.2 percentage points in 2017

Medium product forms reached 90.0% and small 66.7%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 6.3 percentage points to 87.3% in 2017

| Year | Value |
|------|-------|
| 2013 | 90.7 |
| 2014 | 88.6 |
| 2015 | 84.2 |
| 2016 | 90.6 |
| 2017 | 81.4 |

## Over/Underestimation (%)

Overall underestimation increased by 1.4 percentage points in 2017

Medium product forms were underestimated by 23.8% and small by 26.1%. A minor number of large product forms were grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, improved by 3.3 percentage points to 23.9% in 2017

| Year | Value |
|------|-------|
| 2013 | -11.1 |
| 2014 | -15.3 |
| 2015 | -10.6 |
| 2016 | -25.5 |
| 2017 | -24.1 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 27 | 30 | 27 | 27 | **16** |
| Validated market share in unit terms | 47% | 41% | 47% | 32% | **25%** |
| Validated product forms | 75 | 80 | 94 | 82 | **70** |

## Actions

Review projection level

# Hungary

## Precision (%)

Overall precision index improved by 1.3 percentage points in 2017

Large product forms reached 98.0%, medium 96.2% and small 93.7%

Forms validated in both years, 2016 and 2017, improved slightly by 0.3 percentage points to 96.7% in 2017
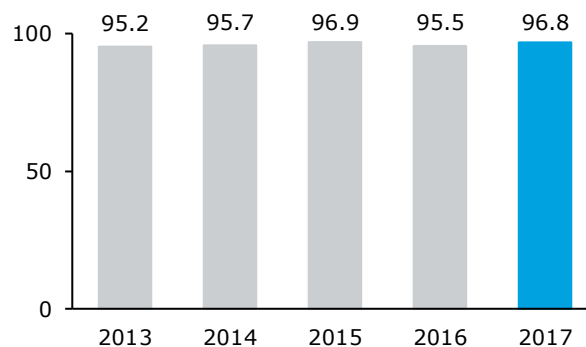


## Over/Underestimation (%)

Overall underestimation improved by 1.4 percentage points in 2017

Large product forms were underestimated by 2.7%, medium by 4.1%, and small by 2.7%

Underestimation of forms validated in both years, 2016 and 2017, improved by 2.3 percentage points to 2.7% in 2017
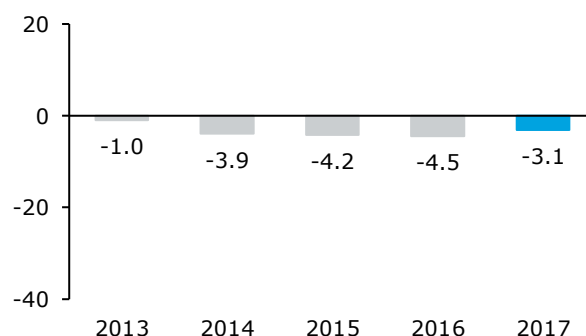


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 42 | 40 | 41 | 30 | **26** |
| Validated market share in unit terms | 69% | 67% | 65% | 47% | **54%** |
| Validated product forms | 308 | 315 | 296 | 209 | **248** |

## Actions

No action required from the statistical point of view

# Italy
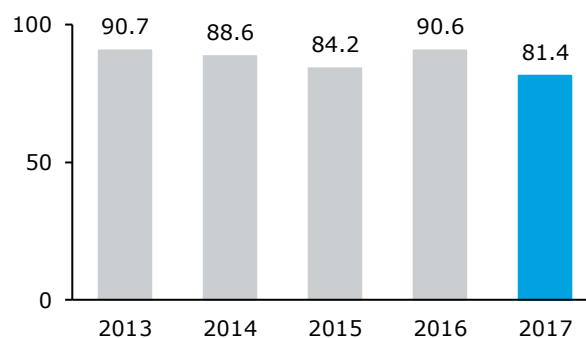
## Precision (%)

Overall precision index declined slightly by 0.1 percentage points in 2017

Medium product forms reached 86.5% and small 94.9%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 4.2 percentage points to 89.4% in 2017
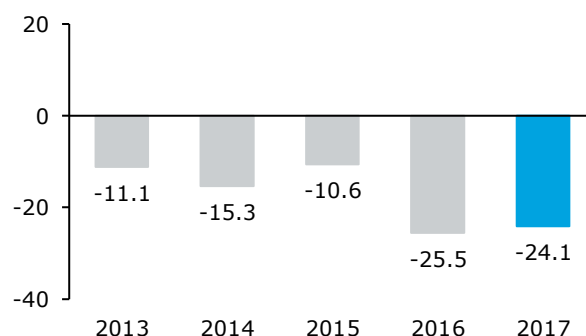
| Year | Value |
|------|-------|
| 2013 | 91.3 |
| 2014 | 96.9 |
| 2015 | |
| 2016 | 89.7 |
| 2017 | 89.6 |
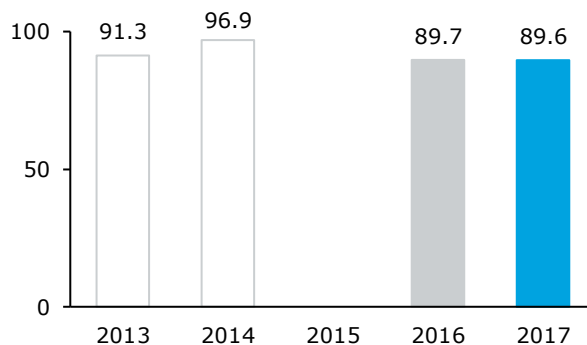
## Over/Underestimation (%)

Overall underestimation increased by 4.2 percentage points in 2017

Medium product forms were underestimated by 9.0%, and small by 10.2%. A minor number of large product forms were grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.3 percentage points to 8.5% in 2017

| Year | Value |
|------|-------|
| 2013 | -8.0 |
| 2014 | -7.7 |
| 2015 | |
| 2016 | -5.1 |
| 2017 | -9.3 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 14 | 12 | | 18 | **15** |
| Validated market share in unit terms | 9% | 8% | | 12% | **10%** |
| Validated product forms | 76 | 64 | | 81 | **76** |

## Actions

No action required from the statistical point of view

# Mexico

## Precision (%)

Overall precision index improved by 3.6 percentage points in 2017

Medium product forms reached 98.9% and small 81.4%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 1.7 percentage points to 91.3% in 2017
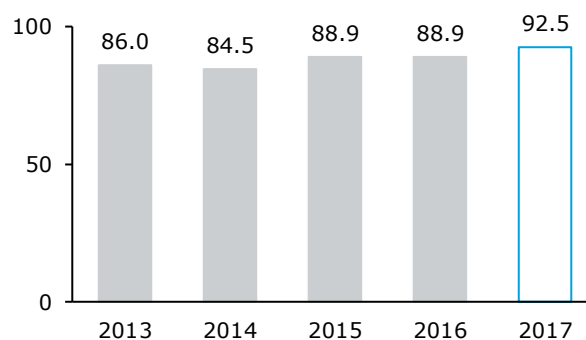


## Over/Underestimation (%)

Overall underestimation improved by 14.7 percentage points in 2017

Medium product forms were underestimated by 2.8%, small were overestimated by 1.9%. A minor number of large product forms was grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, improved by 5.5 percentage points to 1.9% in 2017
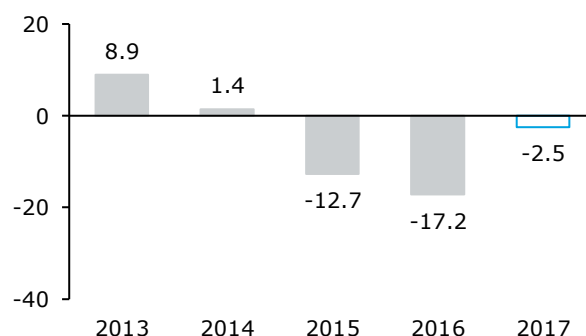


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 12 | 10 | 8 | 10 | **8** |
| Validated market share in unit terms | 27% | 16% | 13% | 14% | **8%** |
| Validated product forms | 254 | 175 | 134 | 162 | **132** |

## Actions

Correct coverage issue: review projection structure or inclusion of new relevant wholesalers

# Poland

## Precision (%)

Overall precision index declined by 6.1 percentage points in 2017

Large product forms reached 78.8%, medium 71.5% and small 72.1%

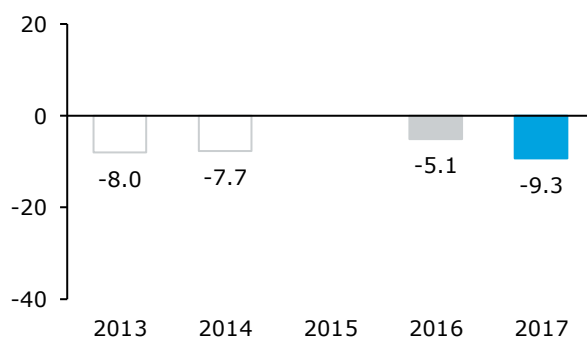Forms validated in both years, 2016 and 2017, improved by 5.2 percentage points to 83.0% in 2017
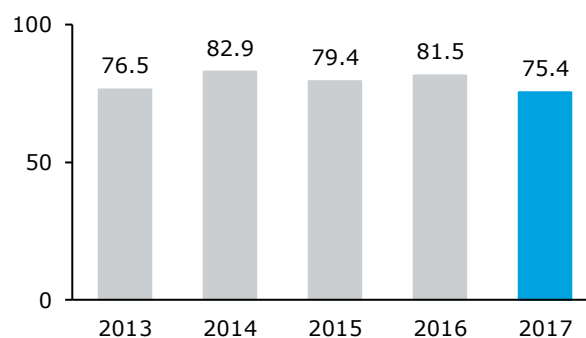


## Over/Underestimation (%)

Overall underestimation increased by 2.7 percentage points in 2017

Large product forms were underestimated by 1.6%, medium by 10.0%, and small by 17.4%

Underestimation of forms validated in both years, 2016 and 2017, improved by 2.8 percentage points to 1.3% in 2017
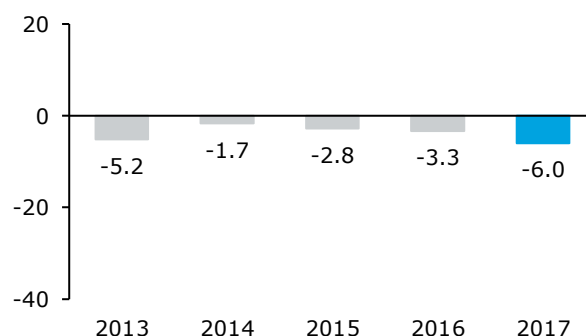


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 40 | 45 | 41 | 36 | **36** |
| Validated market share in unit terms | 21% | 31% | 37% | 34% | **28%** |
| Validated product forms | 231 | 325 | 412 | 366 | **374** |

## Actions

No action required from the statistical point of view

# Slovak Republic

## Precision (%)

Overall precision index improved by 2.3 percentage points in 2017

Large product forms reached a perfect 100%, medium 97.3% and small 94.3%

Forms validated in both years, 2016 and 2017, improved slightly by 0.8 percentage points to 98.9% in 2017

```
100                93.7    95.9    95.9    98.2

 50

  0
         2013    2014    2015    2016    2017
```
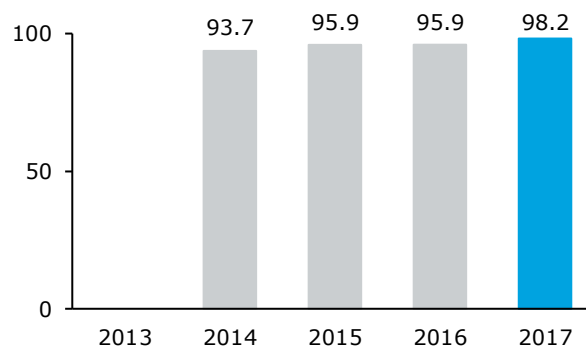
## Over/Underestimation (%)

Overall underestimation increased by 1.1 percentage points in 2017

Large product forms were underestimated by 2.1%, medium by 4.6%, and small by 5.4%

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.2 percentage points to 2.5% in 2017

```
 20

  0
               -4.0    -3.9    -1.7    -2.8

-20

-40
         2013    2014    2015    2016    2017
```
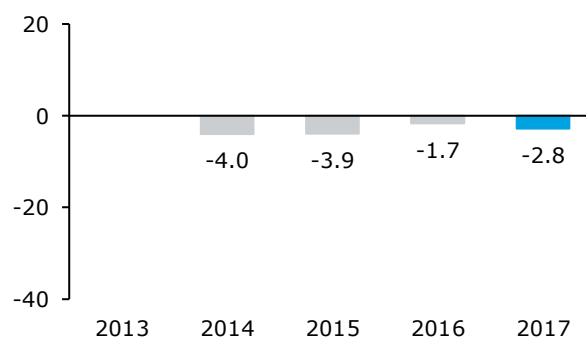
## Participation

| Participation | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | | 9 | 7 | 10 | **11** |
| Validated market share in unit terms | | 31% | 30% | 31% | **42%** |
| Validated product forms | | 107 | 109 | 117 | **161** |

## Actions

No action required from the statistical point of view

# South Africa

## Precision (%)

Overall precision index declined by 6.6 percentage points in 2017

Large product forms reached 97.7%, medium 91.1% and small 83.7%

Forms validated in both years, 2016 and 2017, declined by 10.9 percentage points to 89.1% in 2017



## Over/Underestimation (%)

Overall bias turned from 1.6% overestimation to 6.5% underestimation in 2017

Large product forms were underestimated by 5.3%, medium by 8.5%, and small by 7.8%

Underestimation of forms validated in both years, 2016 and 2017, increased by 11.6 percentage points to 12.4% in 2017
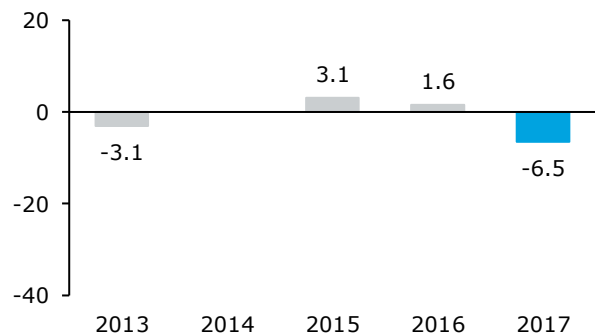


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 21 | | 15 | 13 | **19** |
| Validated market share in unit terms | 11% | | 31% | 15% | **16%** |
| Validated product forms | 193 | | 286 | 198 | **260** |

## Actions

Evaluate projection level

# South Korea

## Precision (%)

Overall precision index improved by 17.4 percentage points in 2017

Medium product forms reached 86.5% and small 77.8%. A minor number of large product forms were grouped into the medium class for analysis
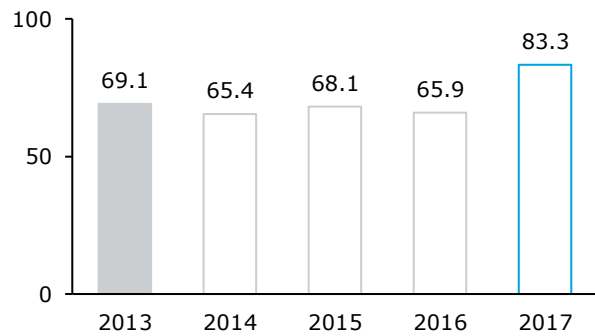


## Over/Underestimation (%)

Overall underestimation improved by 15.6 percentage points in 2017

Medium product forms were underestimated by 3.7%, and small by 2.5%. A minor number of large product forms were grouped into the medium class for analysis
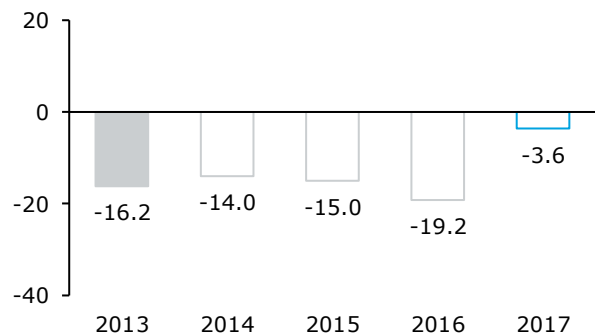


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 8 | 11 | 8 | 6 | **7** |
| Validated market share in unit terms | 17% | 5% | 7% | 4% | **3%** |
| Validated product forms | 204 | 195 | 214 | 76 | **50** |

## Actions

Review projection level and panel composition

Check completeness and accuracy of panel data and replace inadequate panel

# Spain

## Precision (%)

Overall precision index declined by 2.0 percentage points in 2017

Due to low participation, a reasonable breakdown into sales volume groups was not possible

Due to low participation, a significant basket of forms validated in both years, 2016 and 2017, was not available

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 94.5 | 95.4 | 93.8 | 94.9 | 92.9 |

## Over/Underestimation (%)

Overall underestimation increased by 2.0 percentage points in 2017

Due to low participation, a reasonable breakdown into sales volume groups was not possible

Due to low participation, a significant basket of forms validated in both years, 2016 and 2017, was not available

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -6.6 | -6.1 | -4.4 | -1.0 | -3.0 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 8 | 11 | 7 | 6 | **9** |
| Validated market share in unit terms | 15% | 26% | 20% | 13% | **19%** |
| Validated product forms | 55 | 82 | 65 | 39 | **56** |

## Actions

Motivate more clients to participate in the validation study

# Switzerland

## Precision (%)

Overall precision index improved by 1.2 percentage points in 2017

Large product forms reached 95.3%, medium 91.8% and small 92.2%

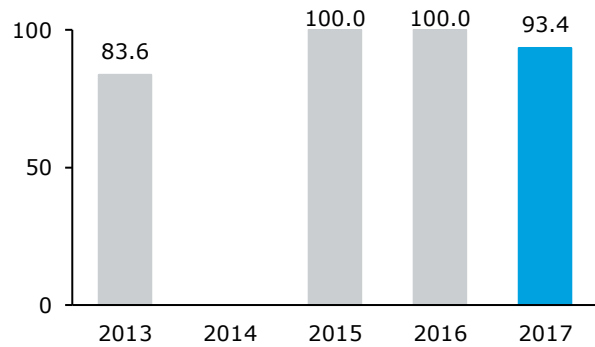Forms validated in both years, 2016 and 2017, improved slightly by 0.8 percentage points to 93.9% in 2017
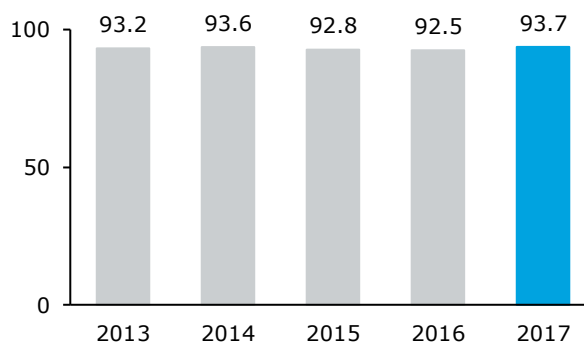


## Over/Underestimation (%)

Overall underestimation increased slightly by 0.7 percentage points in 2017

Large product forms were underestimated by 4.2%, medium by 3.0%, and small by 1.9%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.3 percentage points to 3.5% in 2017
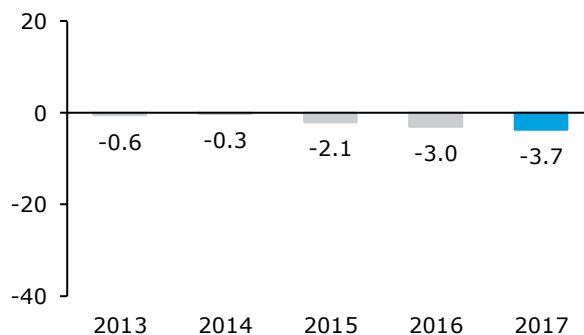


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 124 | 127 | 125 | 117 | **110** |
| Validated market share in unit terms | 83% | 83% | 81% | 81% | **76%** |
| Validated product forms | 1,236 | 1,234 | 1,198 | 1,168 | **1,111** |

## Actions

Evaluate projection level

# Venezuela

## Precision (%)

Overall precision index declined by 3.0 percentage points in 2017

Large product forms reached 93.3%, medium 91.3% and small 80.6%

Forms validated in both years, 2016 and 2017, declined by 9.7 percentage points to 88.7% in 2017

| Year | Value |
|------|-------|
| 2013 | 94.2 |
| 2014 | 94.7 |
| 2015 | 89.4 |
| 2016 | 93.7 |
| 2017 | 90.7 |
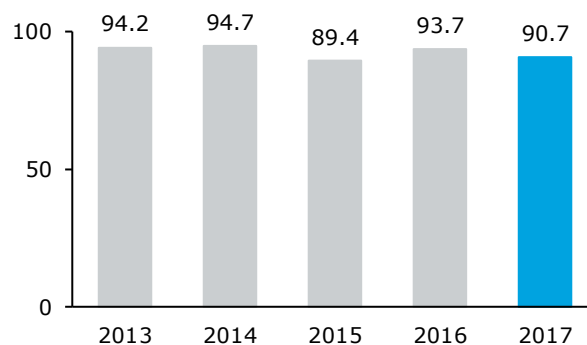
## Over/Underestimation (%)

Overall bias turned from 6.9% underestimation to 4.4% overestimation in 2017

Large product forms were overestimated by 8.0%, medium were underestimated by 3.6%, and small by 6.2%

Overall bias of forms validated in both years, 2016 and 2017, turned from 8.6% underestimation to 1.4% overestimation in 2017

| Year | Value |
|------|-------|
| 2013 | -1.3 |
| 2014 | 2.2 |
| 2015 | -4.9 |
| 2016 | -6.9 |
| 2017 | 4.4 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 37 | 25 | 27 | 22 | **13** |
| Validated market share in unit terms | 55% | 34% | 46% | 50% | **33%** |
| Validated product forms | 376 | 220 | 246 | 181 | **112** |

## Actions

No action required from the statistical point of view

## PharmaTrend Validation Studies

Unlike OTC audits for which only direct sales information is taken from pharmacy panels, PharmaTrend studies are derived from a panel of computerized pharmacies that report not only on sales, but also on purchases and stock inventory. These panels are used in multiple ways:

- Providing direct sales information to national and regional pharmaceutical reports
- Monitoring of new product launches weekly
- Tracking patient care and personal care products
- Estimating OTC *vs*. prescription shares
- Conducting stock and pipeline studies
- Performing sell-out studies

In most countries, we are in a position to validate PharmaTrend estimates against real data provided by IQVIA customers in the standard annual validation process. Thus we are consistently using the same underlying methodology, and the results are comparable. All ethical and OTC pharmaceutical items, excluding patient care and personal care products, are subject to this validation.

Due to the utmost significance of sell-out data, paired with the business interest of our customers, we changed the Pharma-Trend validation target amount from sell-in to sell-out data. The historical results have been adjusted to sell-out data accordingly.

### Overall PharmaTrend Validation Results

For the 2017 PharmaTrend validation studies, 12 countries provided analysable data, of which 10 had uninterrupted 5-year results. We excluded the *Nether-lands* and the *United Kingdom* because

the data are incompatible with the national retail audit. The overall degree of precision in IQVIA PharmaTrend reports is best described by an aggregated precision index for these 10 countries:

*PharmaTrend Precision Index (%)*



| Year | Value |
|------|-------|
| 2013 | 93.8 |
| 2014 | 93.9 |
| 2015 | 93.9 |
| 2016 | 94.1 |
| 2017 | 94.1 |
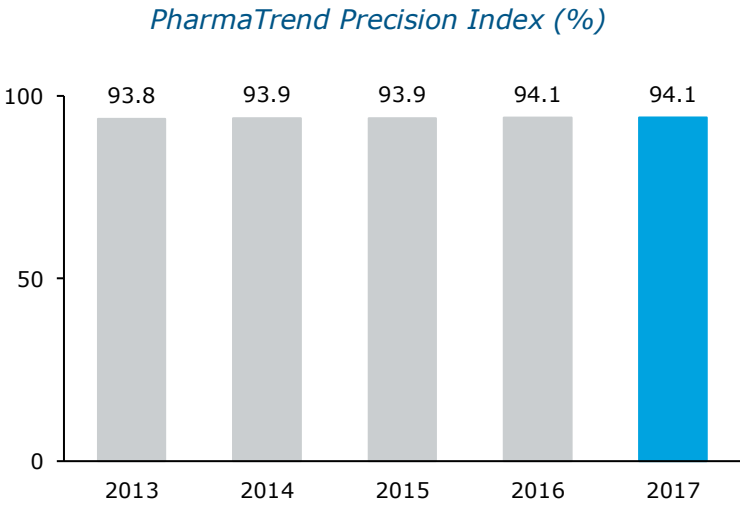
The 2017 PharmaTrend precision index remained unchanged at 94.1%, revealing stable accuracy around 94% in the last five years.

## Improvement & Deterioration

| Country | Improvement | |
|---------|-------------|---|
| | Precision 2017 % | Change vs. 2016 %p |
| Finland | 95.3 | +2.5 |

| Country | Deterioration | |
|---------|---------------|---|
| | Precision 2017 % | Change vs. 2016 %p |
| Portugal | 92.8 | -3.1 |

Only *Finland* (2.5) demonstrated signify-cant improvement of more than two per-centage points over 2016. Only Portugal (-3.1) declined by more than two percen-tage points in 2017. Eleven out of twelve reports achieved precision results ex-ceeding 90% considerably in 2017.

## PharmaTrend Validation Results by Country

The validation studies mentioned on the subsequent country pages refer to the IQVIA PharmaTrend reports.

# Austria

## Precision (%)

Overall precision index declined slightly by 0.7 percentage points in 2017

Large product forms reached 94.4%, medium 92.6% and small 85.3%

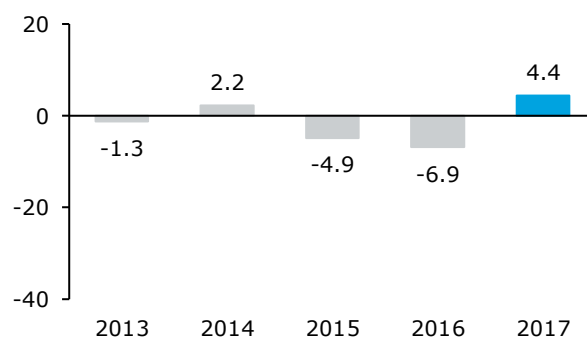Forms validated in both years, 2016 and 2017, declined slightly by 0.8 percentage points to 92.5% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 92.2 | 92.2 | 92.6 | 93.1 | 92.4 |
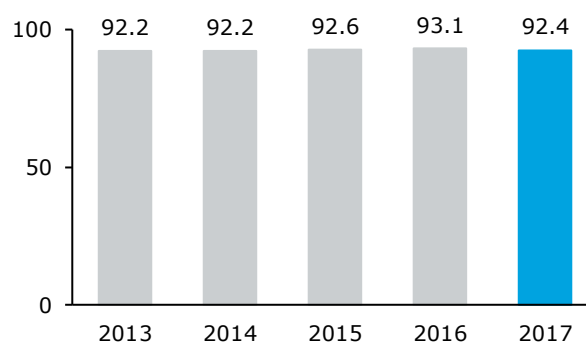
## Over/Underestimation (%)

Overall underestimation increased slightly by 0.9 percentage points in 2017

Large product forms were underestimated by 1.2%, medium by 3.8%, and small by 5.2%

Underestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.8 percentage points to 2.5% in 2017
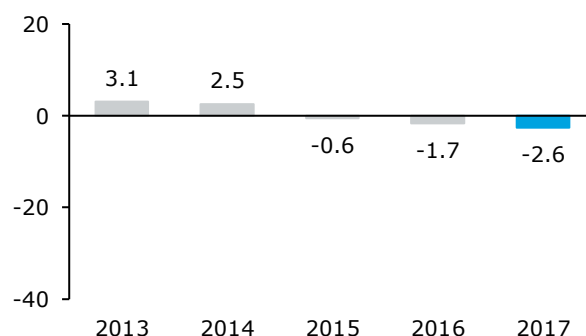
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 3.1 | 2.5 | -0.6 | -1.7 | -2.6 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 210 | 210 | 211 | 213 | **221** |
| Validated market share in unit terms | 73% | 73% | 74% | 71% | **70%** |
| Validated product forms | 2,748 | 2,795 | 2,839 | 2,932 | **2,969** |

## Actions

No action required from the statistical point of view

# Croatia

## Precision (%)

Overall precision index improved by 1.8 percentage points in 2017

Small product forms reached 92.9%. A minor number of large and medium product forms were grouped into the small class for analysis

Forms validated in both years, 2016 and 2017, improved by 3.3 percentage points to 95.0% in 2017
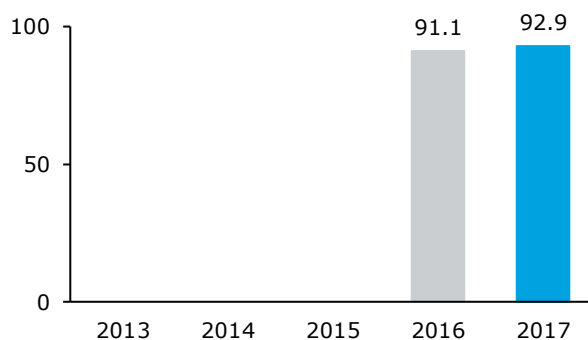


## Over/Underestimation (%)

Overall bias turned from 4.5% underestimation to 1.1% overestimation in 2017

Small product forms were overestimated by 1.1%. A minor number of large and medium product forms were grouped into the small class for analysis

Underestimation of forms validated in both years, 2016 and 2017, improved by 1.8 percentage points to 1.8% in 2017
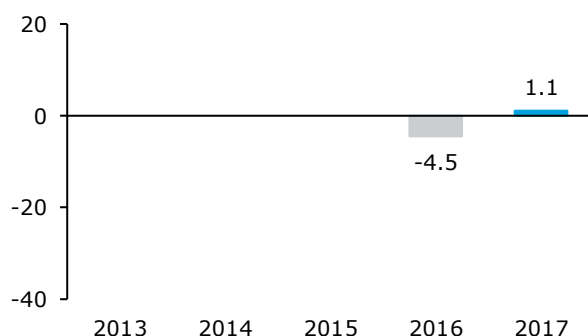


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | | | | 11 | **11** |
| Validated market share in unit terms | | | | 26% | **23%** |
| Validated product forms | | | | 247 | **254** |

## Actions

Enhance audit coverage by including specialized pharmacies

# Czech Republic

## PharmaTrend Validation Study

### Precision (%)

Overall precision index improved slightly by 0.5 percentage points in 2017

Large product forms reached 97.7%, medium 94.8% and small 90.4%

Forms validated in both years, 2016 and 2017, declined slightly by 0.1 percentage points to 96.8% in 2017

| Year | Precision |
|------|-----------|
| 2013 | 94.6 |
| 2014 | 93.6 |
| 2015 | 94.9 |
| 2016 | 95.1 |
| 2017 | 95.6 |

### Over/Underestimation (%)

Overall underestimation increased by 2.0 percentage points in 2017

Large product forms were underestimated by 6.6%, medium by 6.8%, and small by 8.8%

Underestimation of forms validated in both years, 2016 and 2017, increased by 2.1 percentage points to 6.6% in 2017

| Year | Over/Underestimation |
|------|----------------------|
| 2013 | 0.0 |
| 2014 | -4.8 |
| 2015 | -6.0 |
| 2016 | -4.8 |
| 2017 | -6.8 |

### Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 21 | 26 | 20 | 19 | **21** |
| Validated market share in unit terms | 30% | 29% | 26% | 25% | **30%** |
| Validated product forms | 853 | 841 | 708 | 700 | **876** |

### Actions

Review projection level and panel composition

# Finland

## Precision (%)

Overall precision index improved slightly by 0.4 percentage points in 2017

Large product forms reached 97.7%, medium 96.4% and small 84.8%

Forms validated in both years, 2016 and 2017, improved by 1.3 percentage points to 95.7% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 96.2 | 95.2 | 95.4 | 94.9 | 95.3 |

## Over/Underestimation (%)

Overall overestimation improved slightly by 0.3 percentage points in 2017

Large product forms were overestimated by 7.0%, medium by 4.9% and small by 1.9%

Overestimation of forms validated in both years, 2016 and 2017, turned from 1.8% underestimation in 2016 to 5.5% overestimation in 2017
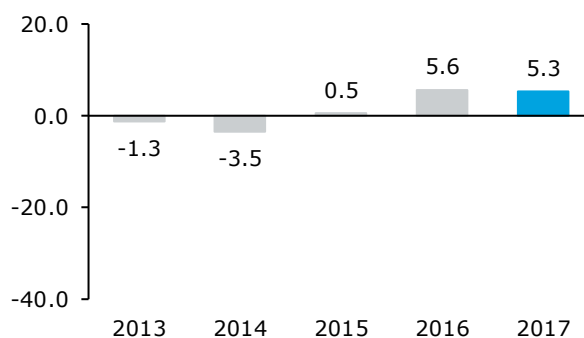
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -1.3 | -3.5 | 0.5 | 5.6 | 5.3 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 111 | 112 | 119 | 119 | **120** |
| Validated market share in unit terms | 47% | 46% | 57% | 55% | **58%** |
| Validated product forms | 1,505 | 1,494 | 1,545 | 1,617 | **1,735** |

## Actions

No action required from the statistical point of view

# Germany

## Precision (%)

Overall precision index improved slightly by 0.4 percentage points in 2017

Large product forms reached 97.2%, medium 93.5% and small 81.9%

Forms validated in both years, 2016 and 2017, declined slightly by 0.5 percentage points to 94.5% in 2017

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 92.5 | 92.9 | 93.0 | 93.2 | 93.6 |

## Over/Underestimation (%)

Overall overestimation improved slightly by 0.3 percentage points in 2017

Large product forms were underestimated by 0.2%, medium were overestimated by 1.4% and small by 0.8%

Overestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.4 percentage points to 0.4% in 2017
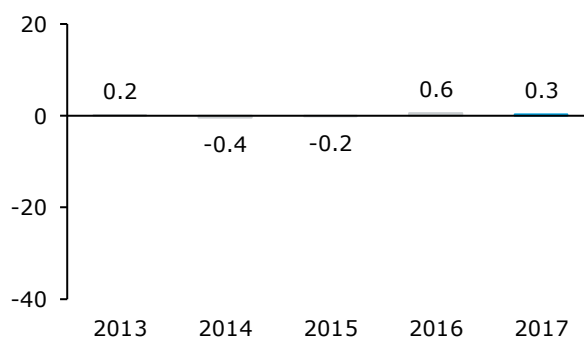
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 0.2 | -0.4 | -0.2 | 0.6 | 0.3 |

## Participation

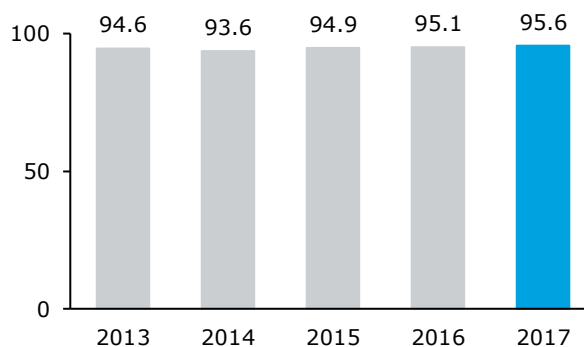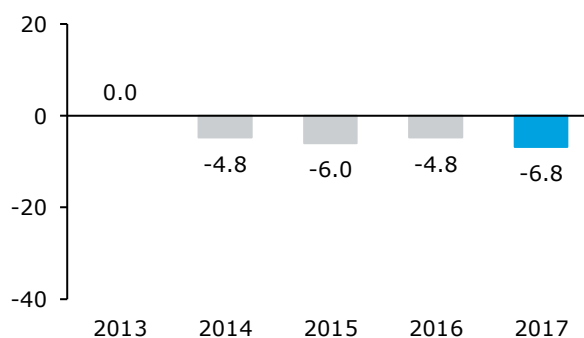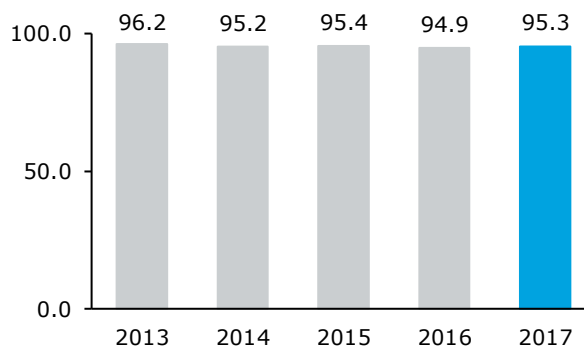| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 39 | 41 | 39 | 37 | **36** |
| Validated market share in unit terms | 32% | 32% | 25% | 21% | **21%** |
| Validated product forms | 3,426 | 3,527 | 3,330 | 2,686 | **2,533** |

## Actions

No action required from the statistical point of view

# Hungary

## Precision (%)

Overall precision index improved slightly by 0.6 percentage points in 2017

Large product forms reached 98.8%, medium 97.9% and small 88.2%

Forms validated in both years, 2016 and 2017, improved slightly by 0.2 percentage points to 97.0% in 2017

| Year | Value |
|------|-------|
| 2013 | 95.4 |
| 2014 | 95.3 |
| 2015 | 96.6 |
| 2016 | 96.2 |
| 2017 | 96.8 |
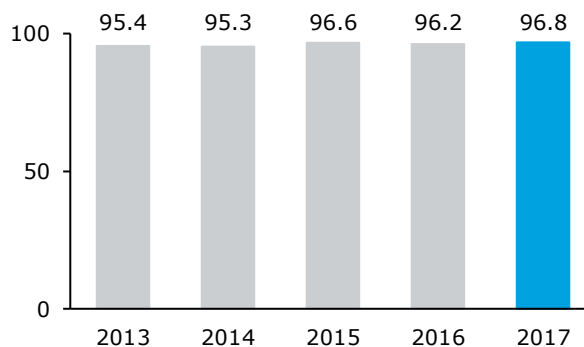
## Over/Underestimation (%)

Overall underestimation improved by 4.3 percentage points in 2017

Large product forms were underestimated by 0.8%, medium by 2.3%, and small by 4.5%

Underestimation of forms validated in both years, 2016 and 2017, improved by 3.1 percentage points to 3.1% in 2017

| Year | Value |
|------|-------|
| 2013 | -3.1 |
| 2014 | -4.8 |
| 2015 | -6.4 |
| 2016 | -6.0 |
| 2017 | -1.7 |

## Participation

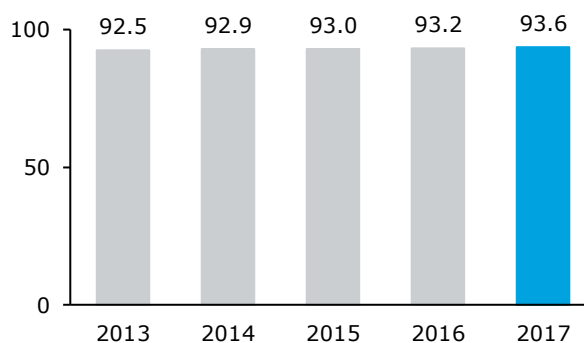| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 80 | 82 | 83 | 63 | **49** |
| Validated market share in unit terms | 40% | 34% | 29% | 37% | **46%** |
| Validated product forms | 1,376 | 1,403 | 1,257 | 929 | **1,046** |

## Actions

No action required from the statistical point of view

# Italy

## Precision (%)

Overall precision index improved slightly by 0.3 percentage points in 2017

Large product forms reached 98.1%, medium 95.7% and small 91.4%

Forms validated in both years, 2016 and 2017, improved slightly by 0.1 percentage points to 96.1% in 2017

| Year | Value |
|------|-------|
| 2013 | 95.6 |
| 2014 | 96.6 |
| 2015 | 95.3 |
| 2016 | 96.0 |
| 2017 | 96.3 |
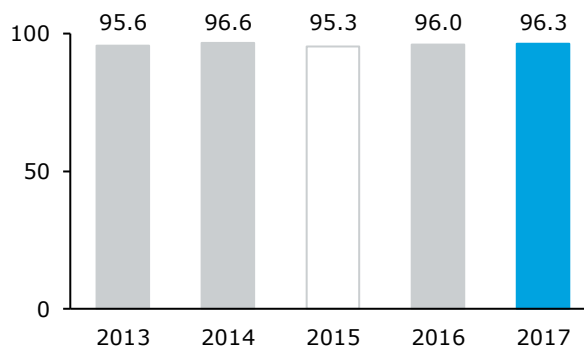
## Over/Underestimation (%)

Overall underestimation increased by 2.4 percentage points in 2017

Large product forms were underestimated by 3.3%, medium by 3.9%, and small by 4.4%

Underestimation of forms validated in both years, 2016 and 2017, increased by 2.1 percentage points to 2.8% in 2017

| Year | Value |
|------|-------|
| 2013 | -2.9 |
| 2014 | -4.8 |
| 2015 | -4.7 |
| 2016 | -1.2 |
| 2017 | -3.6 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 31 | 22 | 15 | 35 | **26** |
| Validated market share in unit terms | 25% | 18% | 9% | 28% | **26%** |
| Validated product forms | 972 | 670 | 473 | 1,142 | **1,074** |

## Actions

No action required as the Italy PTR offering will be replaced by a newly launched offering as of 2019

# Poland

## Precision (%)

Overall precision index declined by 1.3 percentage points in 2017

Large product forms reached 88.1%, medium 85.8% and small 85.2%

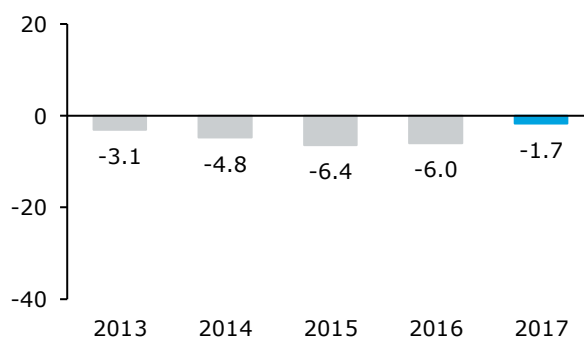Forms validated in both years, 2016 and 2017, improved by 4.9 percentage points to 91.7% in 2017
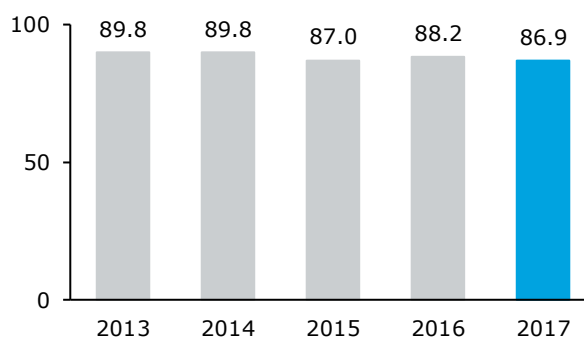
Bar chart — Precision (%):
- 2013: 89.8
- 2014: 89.8
- 2015: 87.0
- 2016: 88.2
- 2017: 86.9

## Over/Underestimation (%)

Overall underestimation increased slightly by 0.9 percentage points in 2017

Large product forms were underestimated by 1.9%, medium by 6.3%, and small by 10.2%

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.8 percentage points to 2.7% in 2017

Bar chart — Over/Underestimation (%):
- 2013: -6.1
- 2014: -5.4
- 2015: -3.3
- 2016: -3.7
- 2017: -4.6
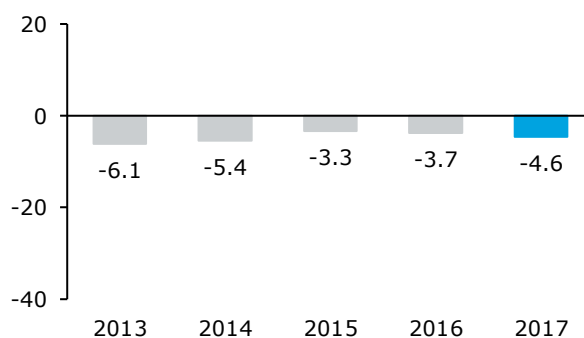
## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 69 | 70 | 70 | 68 | **56** |
| Validated market share in unit terms | 20% | 21% | 27% | 23% | **21%** |
| Validated product forms | 977 | 1,110 | 1,430 | 1,304 | **1,095** |

## Actions

No action required from the statistical point of view

# Portugal

## Precision (%)

Overall precision index declined by 3.1 percentage points in 2017

Large product forms reached 97.5%, medium 85.5% and small 92.0%

Forms validated in both years, 2016 and 2017, declined by 1.0 percentage point to 95.3% in 2017

| Year | Value |
|------|-------|
| 2013 | 91.1 |
| 2014 | 98.0 |
| 2015 | 96.9 |
| 2016 | 95.9 |
| 2017 | 92.8 |
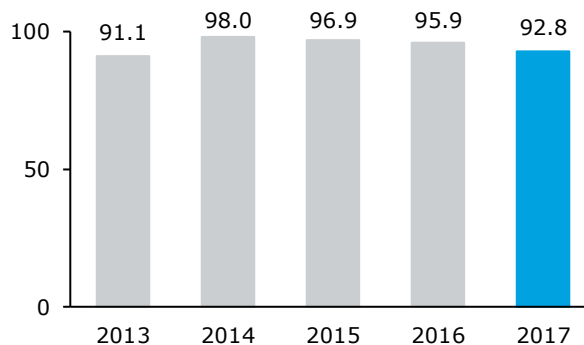
## Over/Underestimation (%)

Overall underestimation improved by 1.8 percentage points in 2017

Large product forms were underestimated by 4.1%, medium by 3.5%, and small by 2.4%

Underestimation of forms validated in both years, 2016 and 2017, improved by 1.3 percentage points to 2.6% in 2017

| Year | Value |
|------|-------|
| 2013 | -10.0 |
| 2014 | -4.8 |
| 2015 | -6.6 |
| 2016 | -5.6 |
| 2017 | -3.8 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 22 | 18 | 17 | 13 | **10** |
| Validated market share in unit terms | 18% | 13% | 14% | 16% | **13%** |
| Validated product forms | 639 | 416 | 462 | 484 | **478** |

## Actions

No action required from the statistical point of view

# Slovak Republic
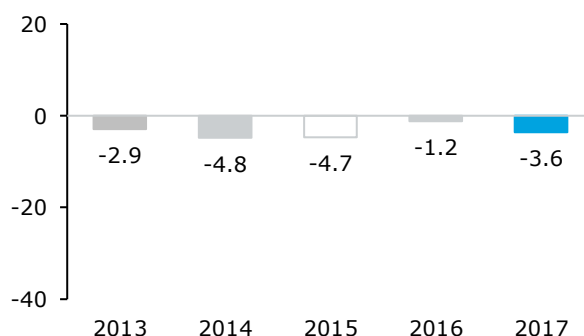
## Precision (%)

Overall precision index improved by 2.4 percentage points in 2017

Large product forms reached 97.0%, medium 93.8% and small 78.5%

Forms validated in both years, 2016 and 2017, improved by 3.5 percentage points to 94.1% in 2017

| Year | Value |
|------|-------|
| 2013 | |
| 2014 | 91.8 |
| 2015 | 90.0 |
| 2016 | 90.7 |
| 2017 | 93.1 |

## Over/Underestimation (%)

Overall underestimation improved slightly by 0.6 percentage points in 2017

Large product forms were underestimated by 3.6%, medium by 3.1% and small by 4.0%

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.9 percentage points to 3.7% in 2017

| Year | Value |
|------|-------|
| 2013 | |
| 2014 | -4.5 |
| 2015 | -5.0 |
| 2016 | -4.1 |
| 2017 | -3.5 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | | 17 | 12 | 18 | **18** |
| Validated market share in unit terms | | 15% | 15% | 14% | **18%** |
| Validated product forms | | 385 | 434 | 366 | **608** |

## Actions

No action required from the statistical point of view

# Spain

## Precision (%)

Overall precision index declined by 1.0 percentage point in 2017

Large product forms reached 95.7%, medium 97.9% and small 92.8%

Forms validated in both years, 2016 and 2017, improved slightly by 0.9 percentage points to 98.4% in 2017

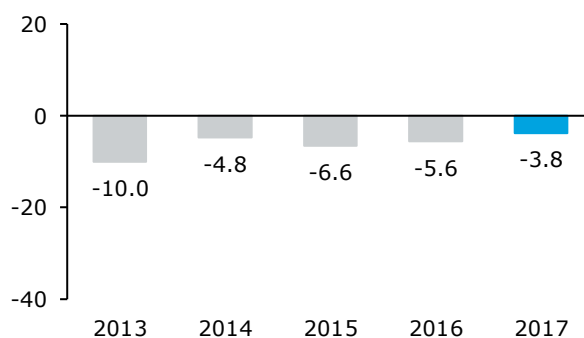| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 97.3 | 94.5 | 97.2 | 96.9 | 95.9 |
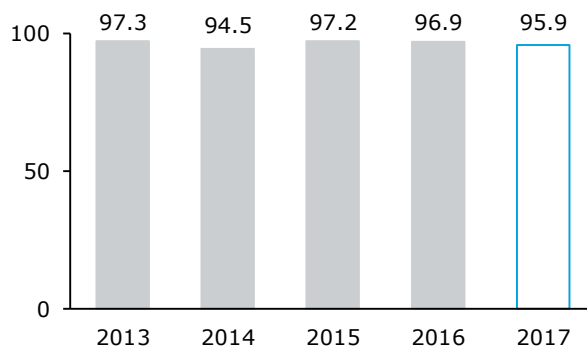
## Over/Underestimation (%)

Overall underestimation increased by 3.1 percentage points in 2017

Large product forms were underestimated by 3.9%, medium by 3.1%, and small by 6.5%

Underestimation of forms validated in both years, 2016 and 2017, increased by 3.1 percentage points to 3.6% in 2017
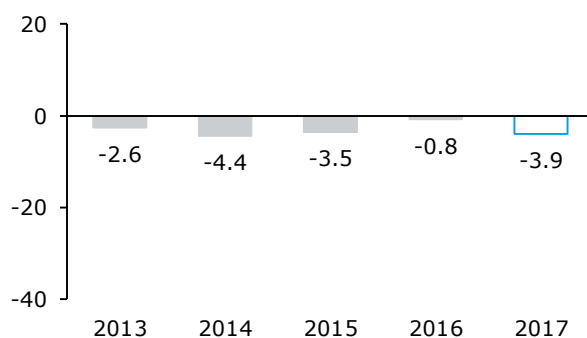
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -2.6 | -4.4 | -3.5 | -0.8 | -3.9 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 15 | 17 | 19 | 18 | **18** |
| Validated market share in unit terms | 11% | 13% | 15% | 11% | **8%** |
| Validated product forms | 534 | 608 | 729 | 588 | **487** |

## Actions

Motivate more clients to participate in the validation study

# Switzerland
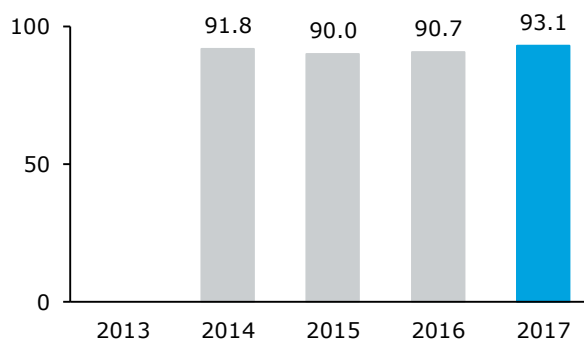
## Precision (%)

Overall precision index improved slightly by 0.4 percentage points in 2017

Large product forms reached 96.7%, medium 95.0% and small 94.6%

Forms validated in both years, 2016 and 2017, improved slightly by 0.4 percentage points to 96.1% in 2017

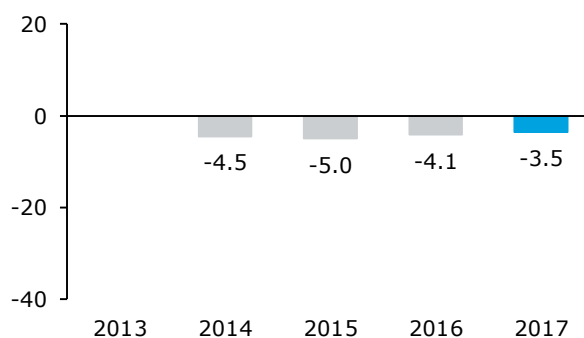| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | 95.2 | 95.4 | 95.3 | 95.4 | 95.8 |
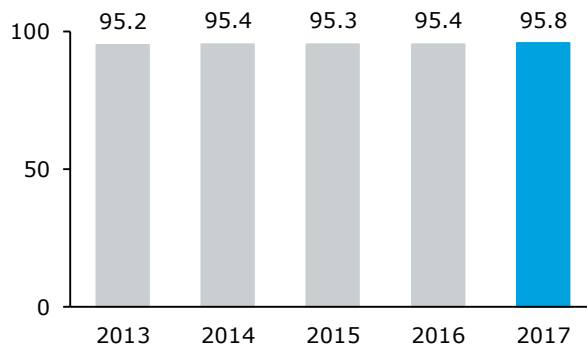
## Over/Underestimation (%)

Overall underestimation increased slightly by 0.1 percentage points in 2017

Large product forms were underestimated by 3.3%, medium by 2.2%, and small by 1.5%

Underestimation of forms validated in both years, 2016 and 2017, remained unchanged at 2.6% in 2017
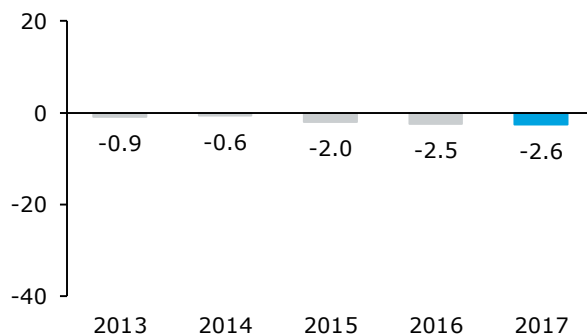
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | -0.9 | -0.6 | -2.0 | -2.5 | -2.6 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 187 | 189 | 185 | 186 | **174** |
| Validated market share in unit terms | 89% | 90% | 90% | 89% | **89%** |
| Validated product forms | 3,167 | 3,234 | 3,206 | 3,237 | **3,015** |

## Actions

Evaluate projection granularity

## Hospital Validation Studies

IQVIA offers two types of hospital audits: purchase-based and consumption-based audits. Although both types target the national hospital market segment, the data collection methodology may produce values that are not directly comparable with the industry's internal sales figures. Several factors lead to this incompatibility, and the validation results have to be interpreted accordingly. Examples are:

- Indirect sales through secondary distribution entities (wholesalers, sub-distributors etc.) are not separable.
- Consumption often does not give an indication of the original pack dispensation.

- Generic products cannot be assigned to individual manufacturers.

Hospital consumption audits measure deliveries from hospital pharmacies to hospital departments. These measures are not fully compatible with manufacturer sales into pharmacies. Large gaps or inconsistencies in the points of measurement between the two tracking systems result in lower precision values. Therefore, when interpreting the validation results, we less focus on their absolute value, but more on changes from one year to another.

### Global Hospital Validation Results

For the 2017 validation studies, 22 countries provided analysable results. No validation study was necessary in *Denmark*, *Finland*, *New Zealand*, *Norway* and *Sweden* because we collect full census data in these countries and we suppose 100% precision in these five markets. This makes a total of 27 sets of validation results, of which 25 had uninterrupted five-year results. The overall degree of precision in IQVIA hospital reports is best described by an aggregated precision index for these 25 countries:

### Hospital Precision Index (%)



| Year | Value |
|------|-------|
| 2013 | 92.3 |
| 2014 | 92.9 |
| 2015 | 93.0 |
| 2016 | 92.4 |
| 2017 | 91.9 |
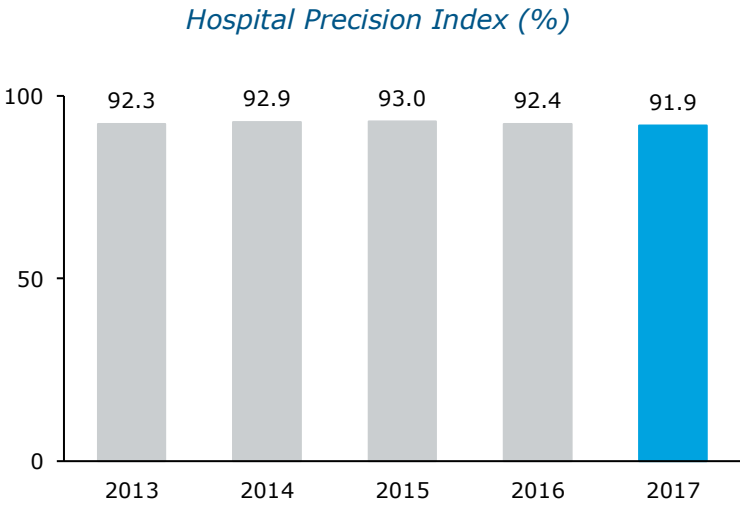
The world-wide precision index of hospital reports declined slightly by 0.5 percentage points, from 92.4% in 2016 to 91.9% in 2017.

## Improvement & Deterioration

| Country | Improvement | |
|---------|-------------|---|
| | Precision 2017 % | Change vs. 2016 %p |
| Italy | 90.8 | +6.9 |

| Country | Deterioration | |
|---------|---------------|---|
| | Precision 2017 % | Change vs. 2016 %p |
| Austria | 84.2 | -4.4 |
| Serbia | 94.4 | -3.9 |
| South Korea | 50.4 | -8.9 |
| Spain | 43.1 | -10.8 |

Only *Italy* (6.9) showed significant improvement of more than 2 percentage points over 2016. Four countries declined by more than 2 percentage points, most significantly *Spain* with a 10.8 percentage points loss.

## Hospital Validation Results by Country

From the 22 countries with analysable results, 14 were validated jointly with their equivalent retail audits (*Bosnia & Herzegovina*, *Croatia, Czech Republic, Hungary, Japan, Kazakhstan, Poland, Russia, Serbia, Slovak Republic, Slovenia, Switzerland, USA* and *Vietnam*). The detailed results for these countries can be found in the retail section of this Accuracy part. The remaining 8 countries with pure hospital validation results are presented on the subsequent pages.

# Austria

## Precision (%)

Overall precision index declined by 4.4 percentage points in 2017

Large product forms reached 89.4%, medium 78.2% and small 78.8%

Forms validated in both years, 2016 and 2017, declined by 1.0 percentage point to 86.7% in 2017
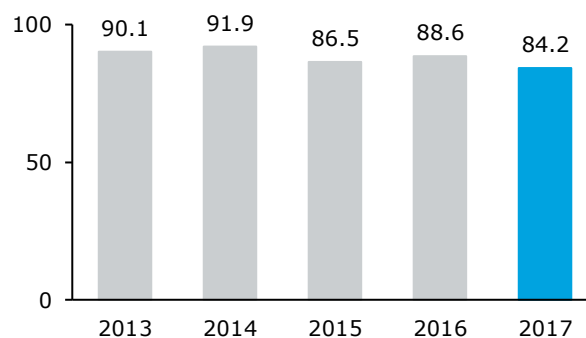


## Over/Underestimation (%)

Overall overestimation increased slightly by 0.2 percentage points in 2017

Large product forms were overestimated by 4.3%, medium were underestimated by 0.8%, small were overestimated by 0.9%

Overestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.3 percentage points to 2.6% in 2017
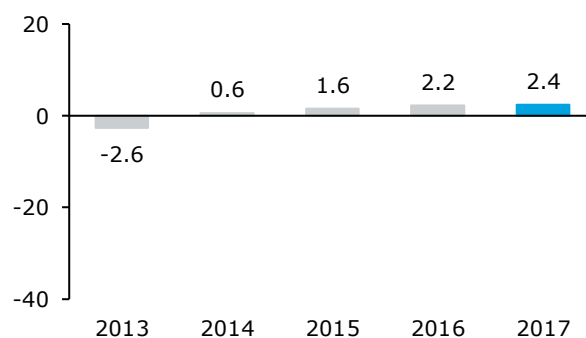


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 10 | 12 | 14 | 12 | **11** |
| Validated market share in unit terms | 23% | 27% | 35% | 29% | **22%** |
| Validated product forms | 417 | 472 | 626 | 540 | **349** |

## Actions

Adjust projection level

Improve bridging process and quality of incoming data

# Canada

## Precision (%)

Overall precision index improved slightly by 0.2 percentage points in 2017

All sales volume groups reached 100%

Forms validated in both years, 2016 and 2017, improved slightly by 0.3 percentage points to a perfect 100% in 2017

| Year | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|
| Precision | 99.7 | 99.7 | 98.7 | 99.8 | 100.0 |
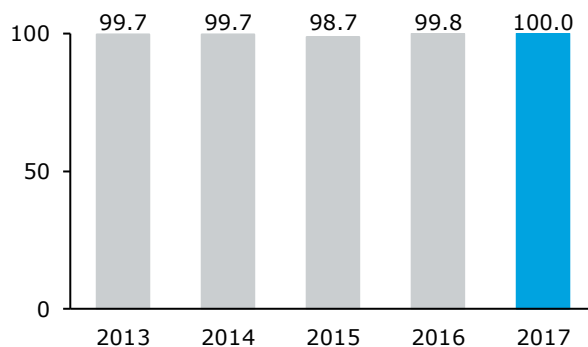
## Over/Underestimation (%)

Overall bias turned from 0.4% overestimation to 0.1% underestimation in 2017

Large product forms showed no bias, medium were underestimated by 0.2%, and small by 0.2%

Overall bias of forms validated in both years, 2016 and 2017, turned from 0.9% overestimation to 0.4% underestimation in 2017

| Year | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|
| Bias | 1.1 | 0.9 | 0.9 | 0.4 | -0.1 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|
| Participating companies | 59 | 63 | 64 | 71 | **115** |
| Validated market share in unit terms | 95% | 95% | 95% | 95% | **95%** |
| Validated product forms | 865 | 851 | 885 | 886 | **1,260** |

## Actions

No action required from the statistical point of view

# China

## Precision (%)

Overall precision index improved slightly by 0.2 percentage points in 2017

Forms validated in both years, 2016 and 2017, improved slightly by 0.5 percentage points to 96.5% in 2017
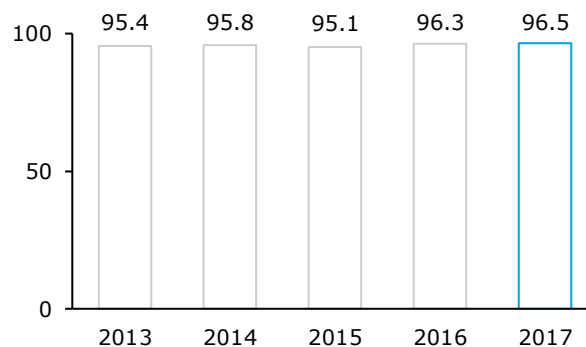


## Over/Underestimation (%)

Overall underestimation improved by 4.9 percentage points in 2017

Medium product forms were underestimated by 6.3% and small by 4.1%. A minor number of large product forms were grouped into the medium class for analysis

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.6 percentage points to 5.2% in 2017
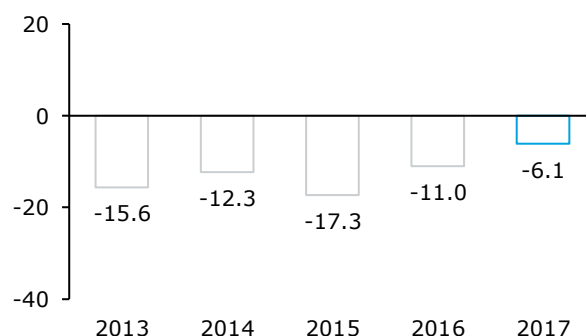


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 44 | 39 | 43 | 34 | **25** |
| Validated market share in unit terms | 5% | 4% | 5% | 4% | **3%** |
| Validated product forms | 330 | 286 | 342 | 240 | **169** |

## Actions

Update universe and panel

Adjust projection methodology

Evaluate alternative data sources long-term

# Germany

## Precision (%)

Overall precision index improved slightly by 0.7 percentage points in 2017

Large product forms reached 94.7%, medium 89.9% and small 50.4%

Forms validated in both years, 2016 and 2017, improved by 1.1 percentage points to 87.2% in 2017
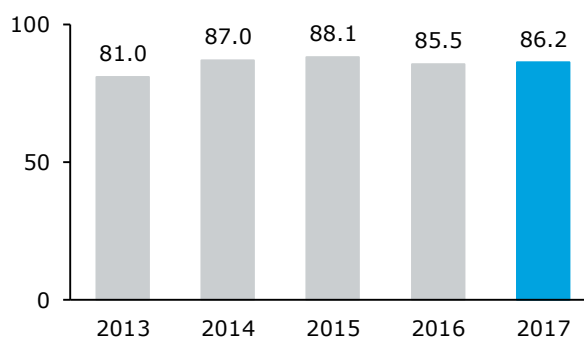
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| | 81.0 | 87.0 | 88.1 | 85.5 | 86.2 |

## Over/Underestimation (%)

Overall overestimation improved slightly by 0.5 percentage points in 2017

Large product forms were overestimated by 4.1%, medium by 4.8%, and small by 10.8%

Overestimation of forms validated in both years, 2016 and 2017, increased slightly by 0.1 percentage points to 6.0% in 2017
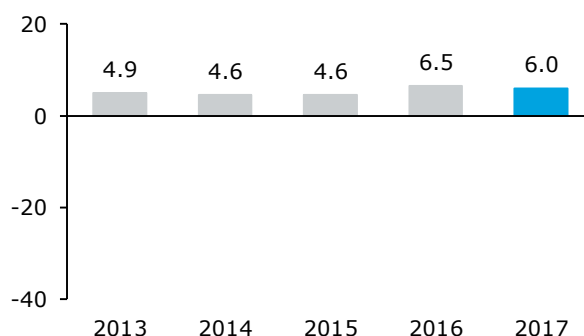
| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| | 4.9 | 4.6 | 4.6 | 6.5 | 6.0 |

## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Participating companies | 21 | 22 | 23 | 24 | **24** |
| Validated market share in value terms | 42% | 50% | 47% | 45% | **49%** |
| Validated product forms | 820 | 1,244 | 1,173 | 1,120 | **1,080** |

## Actions

No action required from the statistical point of view

# Italy

## Precision (%)

Overall precision index improved by 6.9 percentage points in 2017

Large product forms reached 97.0%, medium 84.4% and small 82.7%

Forms validated in both years, 2016 and 2017, declined by 1.8 percentage points to 86.8% in 2017
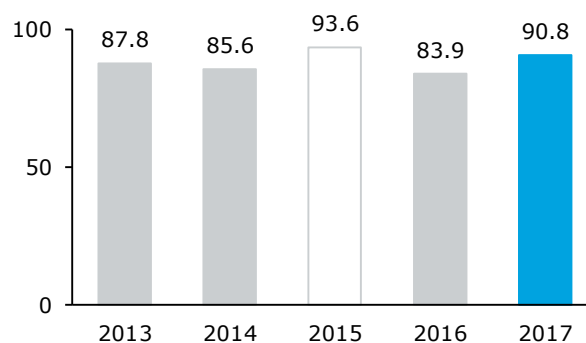


## Over/Underestimation (%)

Overall underestimation improved by 8.5 percentage points in 2017

Large product forms were underestimated by 4.2%, medium by 11.1%, and small by 14.0%

Underestimation of forms validated in both years, 2016 and 2017, improved by 4.7 percentage points to 10.7% in 2017
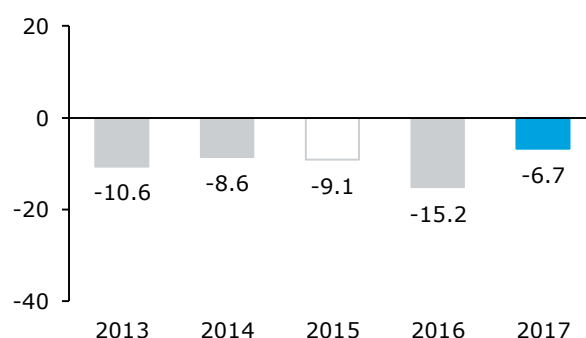


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 13 | 10 | 6 | 12 | **10** |
| Validated market share in unit terms | 15% | 12% | 6% | 15% | **24%** |
| Validated product forms | 184 | 143 | 80 | 235 | **233** |

## Actions

Review statistical methodology for manufacturer data

# South Korea

## Precision (%)

Overall precision index declined by 8.9 percentage points in 2017

Due to low participation, a reasonable breakdown into sales volume groups was not possible

Forms validated in both years, 2016 and 2017, declined by 1.8 percentage points to 60.0% in 2017
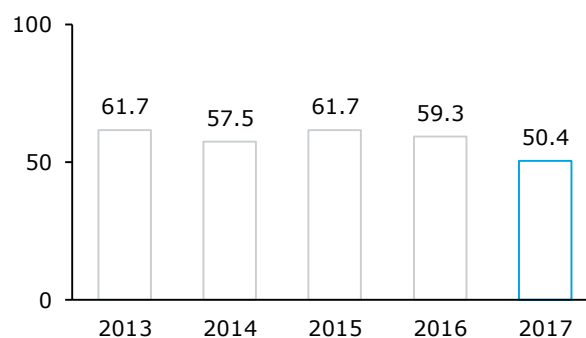


## Over/Underestimation (%)

Overall underestimation improved by 1.5 percentage points in 2017

Due to low participation, a reasonable breakdown into sales volume groups was not possible

Underestimation of forms validated in both years, 2016 and 2017, improved slightly by 0.1 percentage points to 20.0% in 2017
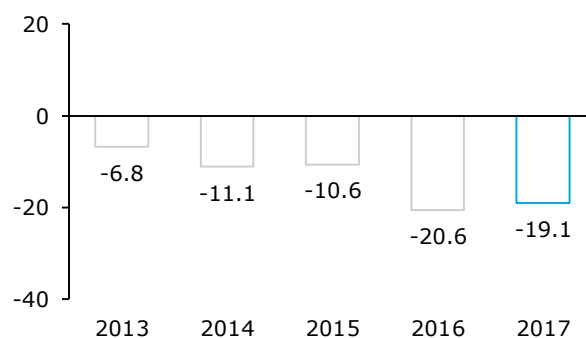


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 12 | 17 | 12 | 14 | **12** |
| Validated market share in unit terms | 7% | 5% | 6% | 3% | **1%** |
| Validated product forms | 175 | 181 | 154 | 132 | **117** |

## Actions

Review projection level and panel composition

Improve QC methodology

# Spain

## Precision (%)

Overall precision index declined by 10.8 percentage points in 2017

Medium product forms reached 40.5% and small 47.5%. A minor number of large product forms were grouped into the medium class for analysis

Forms validated in both years, 2016 and 2017, declined by 16.0 percentage points to 40.4% in 2017
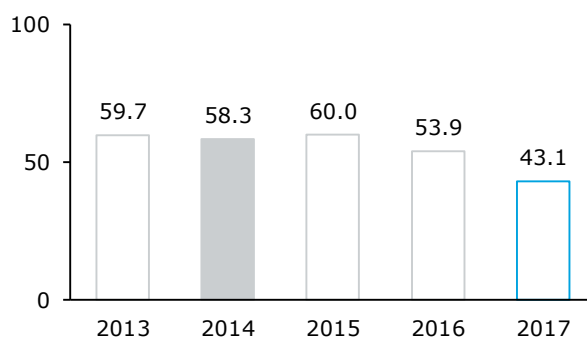


## Over/Underestimation (%)

Overall bias turned from 1.6% underestimation to 11.8% overestimation in 2017

Medium product forms were overestimated by 13.3%, and small by 1.3%. A minor number of large product forms were grouped into the medium class for analysis

Overestimation of forms validated in both years, 2016 and 2017, increased by 10.8 percentage points to 11.6% in 2017
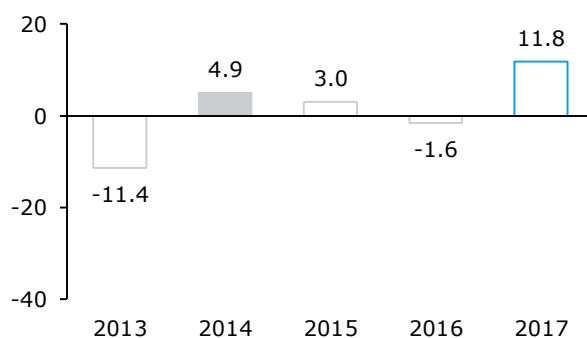


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 8 | 9 | 6 | 6 | **8** |
| Validated market share in unit terms | 2% | 10% | 5% | 6% | **8%** |
| Validated product forms | 72 | 132 | 75 | 128 | **141** |

## Actions

Quality assessment and review of projection frame

# United Kingdom

**Hospital Validation Study**

## Precision (%)

Overall precision index declined slightly by 0.3 percentage points in 2017

Large product forms reached 94.6%, medium 92.6% and small 97.1%
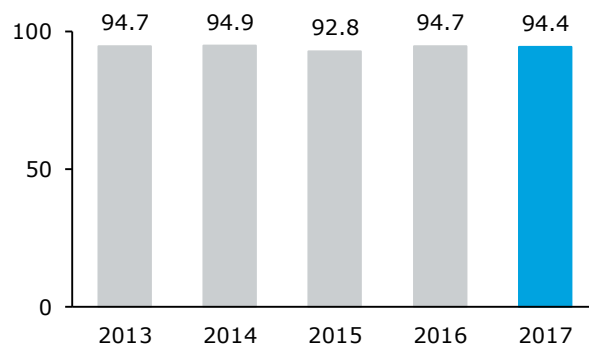


## Over/Underestimation (%)

Overall overestimation improved slightly by 0.5 percentage points in 2017

Large product forms were overestimated by 6.2%, medium were underestimated by 2.4% and small by 4.1%
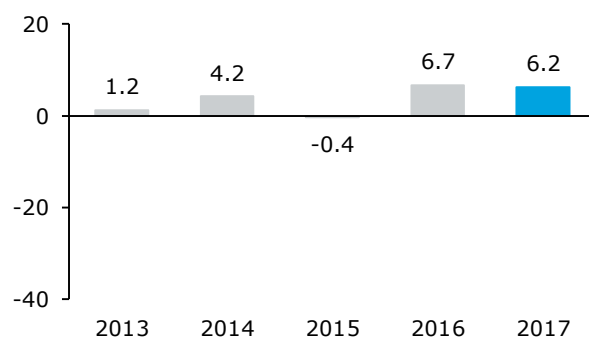


## Participation

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Participating companies | 9 | 9 | 92 | 85 | **65** |
| Validated market share in unit terms | 16% | 13% | 11% | 23% | **13%** |
| Validated product forms | 410 | 419 | 430 | 531 | **403** |

## Actions

No action required from the statistical point of view

## Specialty Markets Validation Results

Given the increasing importance of specialty pharmaceutical markets, we have calculated separate accuracy measures for sub-groups of specialty products captured within our standard national retail and hospital services. These "sub-validations" are derived by filtering out the following four product groups from the standard services:

- Anti-TNF, specific anti-rheumatic agents and immunosuppressants
- Hepatitis B & HIV
- Oncology
- Others

*Others* includes e.g., interferons, immunoglobulins, and drugs for the treatment of acromegaly, Alzheimer's disease, anemia, hemophilia, osteoporosis and metabolic diseases.

From a statistical perspective, specialty products typically occur in small quantities across multiple distribution channels and thus produce highly variable results in any statistical survey. However, due to their importance to the pharmaceutical industry in value terms, we conducted more detailed analyses on their overall validity.

### Global Specialty Markets Validation Results

In order to ensure that our analysis was based on fairly solid samples, we've calculated results only for groups that contain a minimum of 20 product forms in the corresponding validation study. The aggregated bias and precision indices below are provided only for groups that met this criterion in both 2016 *and* 2017. The group *Anti-TNF, specific anti-rheumatic agents and immunosuppressants* represents 7 reports, *Hepatitis B & HIV* contains 3 reports, *Oncology* has 16 reports, *Others* involves 15 reports and *All Specialty Groups* comprises 38 reports:

*Specialty Markets Bias (%)*
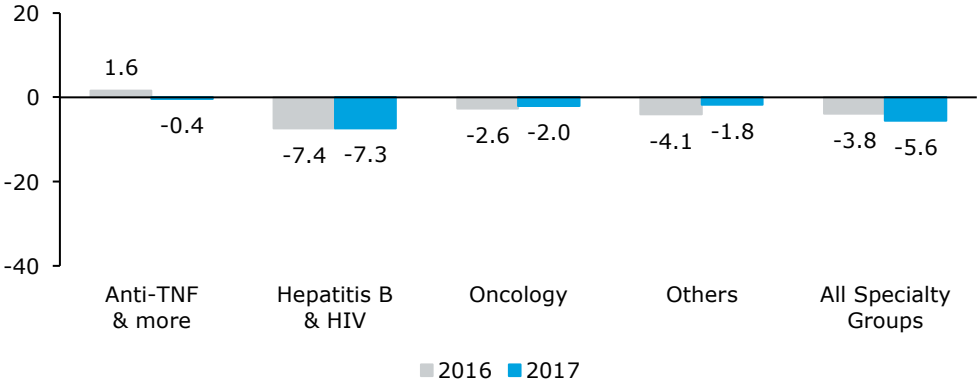
As illustrated in the graph on the previous page, the total underestimation increased by 1.8 percentage points, from 3.8% in 2016 to 5.6% in 2017 for *All Specialty Groups*. Underestimation improvement was achieved for almost all groups, *Hepatitis B & HIV* (0.1), *Oncology* (0.6) and *Others* (2.3)*.* Overall bias for *Anti-TNF & more* turned from 1.6% over-estimation in 2016 to 0.4% under-estimation in 2017.

## Specialty Markets Precision Index (%)
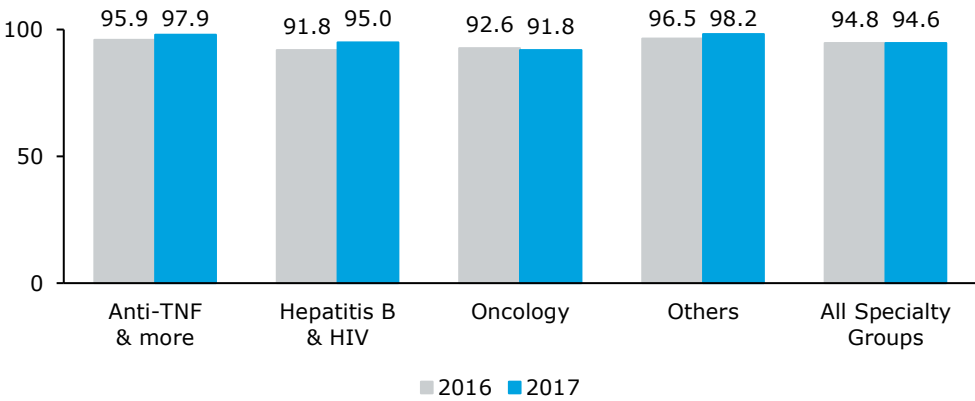


The overall precision index (*All Specialty Groups*) declined slightly by 0.2 percentage points to 94.6% in 2017. The *Hepatitis B & HIV* group showed big improvement of 3.2 percentage points, *Anti-TNF & more* and *Others* group showed improvement of 2.0 percentage points and 1.7 percentage points separately. *Oncology* revealed a slight decrease of 0.8 percentage points.

## Validating IQVIA Forecasting Services

IQVIA Global Market Insights produces market forecasts at country levels to help our clients in their strategic planning. Clearly, the forecast is only one element of the planning process, but it does offer guidance on strategic decisions and business development.

For this purpose, *IQVIA Market Prognosis* – this year providing five-year validations on 38 countries and one-year forecasts on 46 countries – uses a combination of quantitative and qualitative techniques.

Market Prognosis uses a statistical model to derive baseline forecasts. These are then integrated with qualitative input by means of an event-driven forecasting technique, which allows the forecasting team to capture future anticipated changes to market growth.

The validation process was designed as a twofold measurement of forecast validity, one step for the five-year forecast and another for the latest one-year forecast:

1) Compare the five-year forecasts published in the base year with the actual results ultimately attained via IQVIA MISAS. In this report we have compared forecasts for 2013–2017 with actual data for the same years.

2) Compare the published forecast for the most recent year (generated in the preceding year) with the real market sales for the same year. In this case we have compared forecasts for 2017, produced in 2016, with real 2017 results.

### Validity of Annual Forecasts – All Countries

*Forecasting Bias (%) based on 38 Countries*
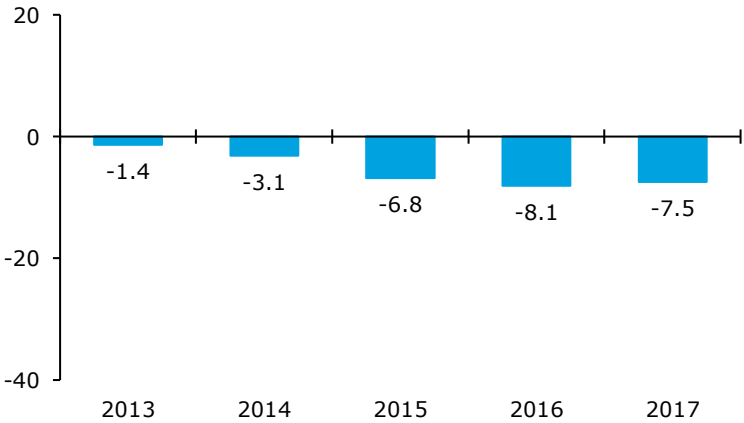


The overall market prognosis for the 38 countries validated this year showed forecasting bias ranging between -8.1% and -1.4%, pointing at relatively good quality of the baseline forecasting model. The one-year forecast for 2017 turned out at an average +0.2 percentage bias for 46 validated countries.

For the entire five-year period, the results by region were as follows:

| Region | Average Bias (%) | |
| --- | --- | --- |
| | 2012..2016 | 2013..2017 |
| AsiaPacific | +2.9 | +0.1 |
| Europe | -2.7 | -8.8 |
| Latin America | -4.6 | -2.6 |
| North America | -6.0 | -12.9 |
| **All Regions** | **-1.3** | **-5.4** |

The average underestimation for *all regions* increased by 4.1 percentage points for 2013..2017. *AsiaPacific* turned out with bias improvement of 2.8 percentage points to 0.1%, *Latin America* turned out with bias improvement of 2.0 percentage points to 2.6%. *North America* revealed an underestimation increase of 6.9 per- centage points to 12.9%, and *Europe* revealed an underestimation increase of 6.1 percentage points to 8.8%. The regional one-year forecast for 2017 revealed very good bias results ranging between -0.2% (*North America*) and +1.4% (*Latin America*).

## Validity of Annual Forecasts – The Ten Leading Markets

The forecast results of the ten leading markets (*USA, China, Japan, Germany, France, Italy, United Kingdom, Brazil,* *Spain and Canada*) are presented in de- scending economic order in the subse- quent graph:

### Forecasting Bias by Country (%)



| | 5 Years (2013..2017) | 1 Year (2017) |
| --- | --- | --- |
| USA | -17.3 | +2.1 |
| China | | +4.6 |
| Japan | +1.4 | +1.3 |
| Germany | -9.2 | -1.1 |
| France | -2.8 | +2.4 |
| Italy | -12.5 | +1.6 |
| United Kingdom | -14.6 | +1.7 |
| Brazil | +2.2 | -1.4 |
| Spain | -19.8 | -0.6 |
| Canada | -8.4 | -2.5 |
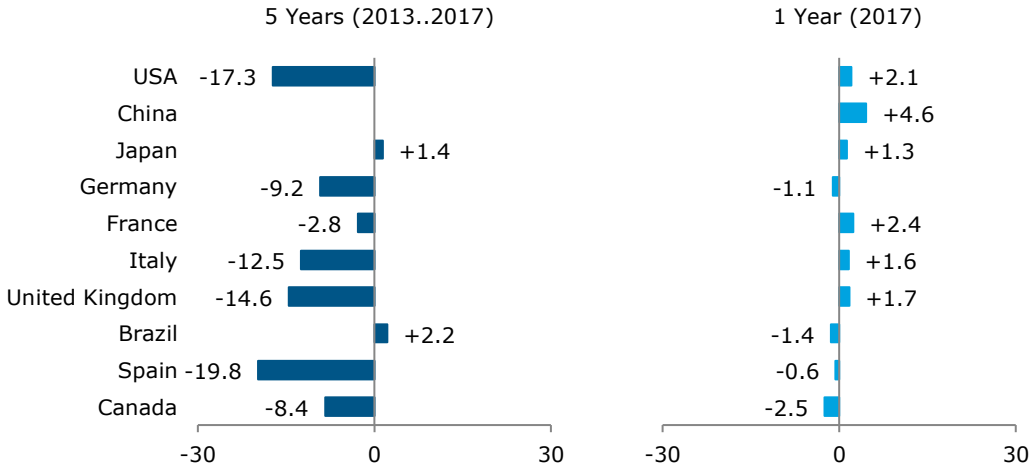
The 5-year forecasts showed accentuated underestimation for some countries, most significantly for *Spain* and *USA*, but also for the *United Kingdom* and *Italy*. The remaining markets had clearly more accurate prognoses.

*China* is not included in the 5-year forecast validation due to a major enhancement of the main hospital audit (CHPA) in 2014. This means that the data used to generate the forecast in 2013 is very different to current MISAS data, invalidating comparisons. The results for *Spain* were mostly affected by higher than expected expenditures for Hepatitis C and other expensive and innovative treatments. In *USA*, the loss of exclusivity impact was overestimated, and price increases of patent-protected brands and

specialty products were higher than expected. In the *United Kingdom*, the new PPRS system did not include the expected price cuts but imposed annual caps on NHS expenditure on brand medicines, and the entry of premium priced new and specialty medicines, such as new Hepatitis C drugs also contributed to the underestimation.

The one-year forecasts revealed low bias for all leading markets.

We continue to develop and improve our forecasting methodologies. We have made significant improvements to new product launch, generic and biosimilar eventing methodologies over the last 2-3 years, from which future forecasting periods will benefit.

## Measures to Maintain and Increase Accuracy

There is a wide array of measures to first of all maintain the high level of data precision and also to improve the data accuracy where our validation results indicate the need. The range of measures include for example new access to large volumes of wholesale data, improved sample stratifications and projections, as well as quality control process improvements. Continuous measurement is crucial to ensuring that IQVIA services remain a useful and accepted reference for pharmaceutical market research and performance measurement.

As we obtain data from samples of wholesalers, pharmacies, and doctors or hospitals, it is of utmost importance that we carefully monitor these market players and react quickly to any changes that could affect the underlying sampling process. To ensure the accuracy of the market estimates we derive, it is essential that we conduct sales channel analyses regularly as well as update the universe and sample distribution routinely.

### Universe Updates

Our commitment to quality dictates that we update universe information in regular cycles – either annually or, in geographic areas with a less effective statistical infra-

structure, in biennial cycles. Our Statistical Services department supervises IQVIA's compliance with these targets for updating universe information:

| Region | Update Target |
|---|---|
| Europe, North America, parts of Pacific | Annual |
| All other regions | Biennial |

In 2018, we monitored a total of 178 universe updates world-wide, of which 25 databases did not comply with the respective target cycles. The overall update index, therefore, slightly decreased by 2 percentage points compared to that in 2017. By universe type, the 2018 update indices are shown on the next page.

*Universe Update Monitor 2018 (%)*

| | |
|---|---|
| All Types | 88 |
| Pharmacies | 89 |
| Doctors | 87 |
| Hospitals | 88 |

Compared to 2017, the update index for hospital universes improved by 2 percentage points to 88%, declined by 4 percentage points to 89% for pharmacy universes and declined slightly by 2 percentage points to 87% for medical universes in 2018.

## Wholesaler & Distributor Data

Statistical theory holds that a massive improvement in data accuracy can only be achieved by increasing the underlying sample, and even that works only up to a point. Beyond that point, any additional gains in accuracy from a larger sample are marginal. Still, larger sampling volumes are required to properly track smaller products and to assure acceptable levels of confidence even in geographical sub-areas.

Naturally, there are limitations with pharmacy panels, and samples cannot be increased at will. Even when pharmacies do become part of the panel, a huge technical effort is required for them to report data in a reasonable timeframe.

For that reason, IQVIA decided to supplement pharmacy panel results by recruiting wholesalers, distributors, and in some cases, pharmaceutical manufacturers to supply data. Meanwhile, in some countries, these alternative sources have become the sole source of data and have brought about significant jumps in precision. In most countries today, we pursue multi-sampling approaches in which pharmacies are used to capture direct sales and wholesalers are used to capture indirect sales to pharmacies and hospitals. Pharmacy samples in turn have grown considerably in many places in order sustain the high quality standards set by the inclusion of near-census information.

By the end of the third quarter 2018, most of the IQVIA countries were using wholesaler or distributor data as their major data source, either exclusively or in addition to other sample components.

78% of the countries have a sampling ratio of at least 70 percent, representing strong retail market coverage.

In nine countries (*Algeria, Austria, Colombia, Germany, Jordan, Latvia, Taiwan, Tunisia and Uruguay*) we made significant progress of 2 to 35 percentage points by including new wholesalers into our panels.

*IQVIA Data Capture in % of Pharmaceutical Market*

| Country | % | | Country | % |
|---|---|---|---|---|
| Algeria | 77 | | Lithuania | 100 |
| Argentina | 95 | | Luxembourg | 98 |
| Australia | 99 | | Macedonia | 55 |
| Austria | 91 | | Malaysia | 72 |
| Bangladesh | 2 | | Mexico | 100 |
| Belgium | 100 | | Morocco | 83 |
| Bolivia | 43 | | Netherlands | 98 |
| Bosnia & Herzegov. | 95 | | New Zealand | 97 |
| Brazil | 100 | | Norway | 100 |
| Bulgaria | 100 | | Pakistan | 88 |
| Canada | 41 | | Paraguay | 64 |
| Central America (6) | 99 | | Peru | 100 |
| Chile | 100 | | Philippines | 65 |
| China | 44 | | Poland | 99 |
| Colombia | 82 | | Portugal | 100 |
| Croatia | 100 | | Puerto Rico | 99 |
| Czech Republic | 100 | | Romania | 95 |
| Denmark | 100 | | Russia | 31 |
| Dominican Republic | 64 | | Saudi Arabia | 98 |
| Ecuador | 99 | | Serbia | 90 |
| Egypt | 96 | | Singapore | 62 |
| Estonia | 40 | | Slovak Republic | 100 |
| Finland | 100 | | Slovenia | 100 |
| France | 60 | | South Africa | 95 |
| French W. Africa (12) | 81 | | South Korea | 54 |
| Germany | 90 | | Spain | 91 |
| Greece | 23 | | Sri Lanka | 11 |
| Hong Kong | 83 | | Sweden | 100 |
| Hungary | 100 | | Switzerland | 100 |
| India | 38 | | Taiwan | 8 |
| Indonesia | 100 | | Thailand | 37 |
| Ireland | 100 | | Tunisia | 72 |
| Italy | 100 | | Turkey | 100 |
| Japan | 99 | | United Arab Emirates | 99 |
| Jordan | 53 | | United Kingdom | 100 |
| Kazakhstan | 86 | | Uruguay | 91 |
| Kuwait | 97 | | USA | 86 |
| Latvia | 61 | | Venezuela | 89 |
| Lebanon | 82 | | Vietnam | 8 |

**acts 2018**

# Timeliness

Besides a critical need for highest accuracy, we acknowledge our clients' desire for quick access to the data and analyses. This calls for a continuous drive for efficiency and upgrading of the product generation process. Streamlining these processes including process analytics, problem solving, and re-engineering is not an overnight task that yields immediate returns; it is a multi-year process that may shave off small increments of time each year.

In 2018, we have achieved a slight improvement of 0.2 days, with an overall average delivery time of 21.2 days. Although this number is still tentative for the entire year 2018 with three months miss-ing, it represents the second-best result in the last five years.

Although delivery time reductions are a great achievement, we are fully aware that there is a limit to the amount of time we can trim from our production cycle, given that we also strive for the highest levels of accuracy. We are approaching this limit now in many countries, and further acceleration of delivery is hardly feasible.

*Elapsed Days after Reporting Period (Average)*
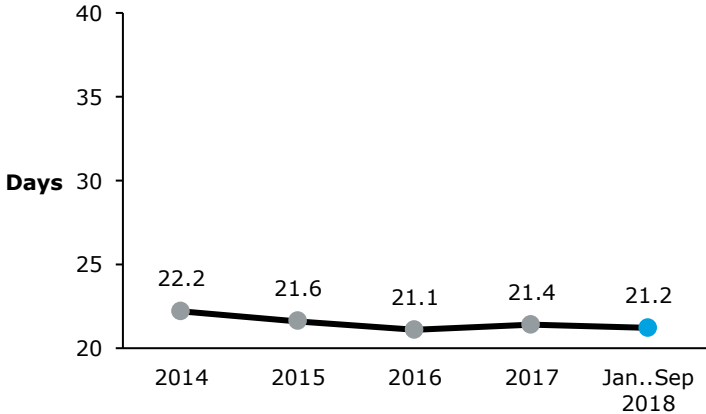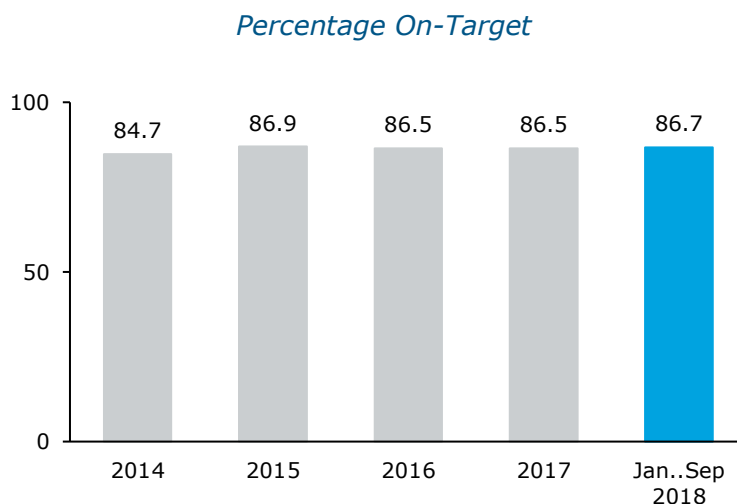


We have reduced our internal targets for data delivery over time. These targets are set independent from local contractual due dates and reflect an IQVIA internal standard to stimulate further improvements in delivery time. Our current internal targets for data delivery are 15 days for weekly services, 30 days for monthly deliveries and 45 days for quarterly services.

Applying the 2005 targets of 15/30/45 days to the more than 34,000 deliveries we made world-wide between January 2014 and September 2018, yields "On-Target Fulfillment" percentages of:

*Percentage On-Target*

| Year | Percentage |
|------|-----------|
| 2014 | 84.7 |
| 2015 | 86.9 |
| 2016 | 86.5 |
| 2017 | 86.5 |
| Jan..Sep 2018 | 86.7 |

The average on-target percentage of all reports improved slightly by 0.2 percentage points, from 86.5% in 2017 to 86.7% up to the third quarter 2018.

## Delivery Performance in Detail

### (1) Data Delivery Mode

The following electronic data delivery systems are offered by IQVIA:

| | |
|---|---|
| MIDAS | Multi-national database – quarterly data, off-site |
| Monthly MIDAS | Multi-national database – monthly data, off-site |
| NDB | National database system, off-site |
| DataView, IMS+, Sales Analyzer | National/sub-national databases, on-site |

As of the ACTS 2013 report, we do not separately analyze the delivery of printed editions due to the general decline of clients using print media. Furthermore we are now collapsing the results for National Database updates as well as Monthly and Quarterly MIDAS deliveries to one single number 'MIDAS'.

MIDAS deliveries were compliant with our internal completion targets at 77% up to the third quarter 2018, a 1 percentage point decline over 2017. The databases improved their compliance by one percentage point to 93%. The graph on the subsequent page illustrates this development.

## Percentage On-Target
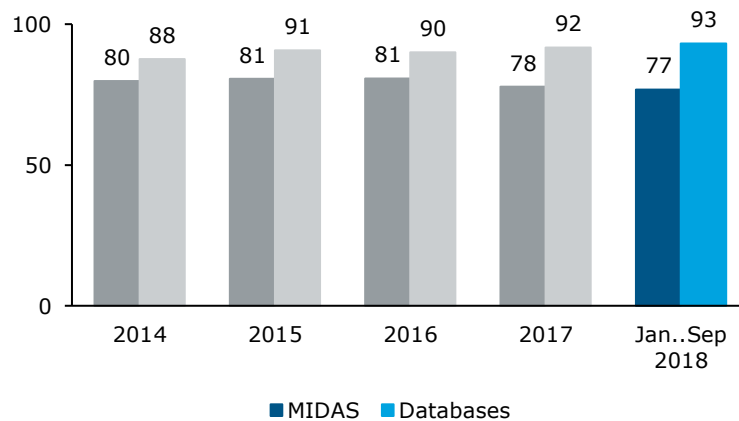


## (2) Report Types

### Delivery by Report Type

| Report | Elapsed Days of Delivery | | | Percentage On-Target * | |
|---|---|---|---|---|---|
| | 2017 Jan..Dec | 2018 Jan..Sep | Earlier (-) Later (+) | 2017 Jan..Dec | 2018 Jan..Sep |
| Hospital | 25.9 | 25.6 | -0.3 | 82% | 84% |
| Medical & Patient | 37.1 | 37.2 | +0.1 | 72% | 70% |
| OTC | 21.4 | 20.7 | -0.7 | 90% | 92% |
| PharmaTrend | 9.4 | 9.2 | -0.2 | 96% | 94% |
| Prescription | 20.5 | 19.7 | -0.8 | 87% | 89% |
| Promotion | 13.4 | 12.8 | -0.6 | 99% | 99% |
| Retail | 23.1 | 23.5 | +0.4 | 86% | 82% |
| Sales Territory | 15.4 | 13.7 | -1.7 | 89% | 96% |
| Xponent | 14.2 | 12.7 | -1.5 | 86% | 91% |

* measured against delivery targets of 15/30/45 days for weekly/monthly/quarterly services

Seven out of nine services managed to accelerate their delivery speed over 2017, most significantly *Sales Territory* services by 1.7 days, followed by *Xponent* (1.5 days) and *Prescription* (0.8 days). The remaining two services have become slower by 0.1 and 0.4 days on average.

Looking at the on-target performance, *Sales Territory* services improved their compliance with internal completion targets most significantly with a 7 percentage points gain over 2017. Six out of nine services managed to maintain or improve their last year's performance in the first three quarters of 2018. Three services reduced their com-pliance by 2 to 4 percentage points. *Medical & Patient* services ended at 70% delivery on time and need clearly improvement.

## (3) Regions

*Delivery by Region*

| Region | Elapsed Days of Delivery | | | Percentage On-Target * | |
|---|---|---|---|---|---|
| | 2017 Jan..Dec | 2018 Jan..Sep | Earlier (-) Later (+) | 2017 Jan..Dec | 2018 Jan..Sep |
| Asia | 28.7 | 28.6 | -0.1 | 79% | 83% |
| Central Europe | 14.7 | 14.9 | +0.2 | 95% | 93% |
| East Europe | 17.4 | 17.1 | -0.3 | 90% | 89% |
| Latin America | 26.3 | 27.7 | +1.4 | 81% | 72% |
| Mid East & Africa | 25.0 | 25.6 | +0.6 | 90% | 87% |
| North America | 23.3 | 22.6 | -0.7 | 81% | 81% |
| North Europe | 17.2 | 16.6 | -0.6 | 91% | 93% |
| Pacific | 23.1 | 23.0 | -0.1 | 89% | 90% |
| South Europe | 21.1 | 19.4 | -1.7 | 79% | 83% |

* measured against delivery targets of 15/30/45 days for weekly/monthly/quarterly services

In terms of delivery days, six out of nine regions were successful in reducing their average delivery time in the first three quarters of 2018, most significantly *South Europe* by 1.7 days, followed by *North America* (0.7 days) and *North Europe* (0.6 days). The remaining three regions slowed down their delivery speed, most significantly *Latin America* by 1.4 days, followed by *Mid East & Africa* with 0.6 days.

Measuring on-target delivery, five regions managed to maintain or improve their 2017 delivery performance in the first three quarters of 2018. The biggest gain was noted for *Asia* and *South Europe* with a 4 percentage points improvement to 83%, however, still leaving room for further growth. Four regions reduced their compliance with our internal delivery targets, most significantly *Latin America* by 9 percentage points, followed by *Mid East & Africa* with a 3 percentage point loss.

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