National Collaborative for Innovation in Quality Measurement (NCINQ)

Measures to Assess the Safe and Judicious Use of Antipsychotics in Children and Adolescents

Field Test Summary

This report summarizes testing results across seven measures developed to evaluate the safe and judicious use of antipsychotic medications in children and adolescents. The measure set is composed of three measures that assess the appropriateness/overuse of antipsychotics in youth and four measures that assess the proper management of youth taking antipsychotics. We describe our methods, data sources, and results from feasibility, validity and reliability analyses. This report focuses on testing results; it supplements information provided in the candidate measure submission forms but describes results for the *full set*, as each measure addresses a different yet important facet of antipsychotic medication management.

I. METHODS

NCINQ employed a multi-step process that includes working with a wide range of stakeholders to define measure specifications and review testing results. We tested the measures in a population of children and adolescents with Medicaid and those with commercial coverage, and we present results at both a state- and health-plan level.

Research Questions

The overall goals of testing are to determine whether the measures are reportable by accountable entities; whether there is variation in performance rates between accountable entities and room for improvement; and whether the measures demonstrate scientific soundness. Our research questions were as follows.

1. What is the eligible population for each measure?
2. What is the distribution of performance rates at the state- and health-plan levels?
3. How does performance vary for important subpopulations?
4. What is the validity and reliability of each measure?

Data Sources

We tested the measures using administrative data sources from the following samples.

- State analyses
  - 2008 claims data from the Medicaid Analytic eXtract (MAX) for 11 states
  - 2011 claims data from 2 MEDNET states
  - 2012 claims data from 1 MEDNET state
- Health plan analyses
  - 2009 claims data from 17 New York State Medicaid health plans.
  - 2013 claims data from 73 commercial health plans nationwide

Study Population

Our study population was the following

- State analyses: children under 21 years with Medicaid coverage
- Plan analyses
  - Children under 18 years with Medicaid coverage
  - Children under 18 years with commercial coverage

In the 2008 MAX data sample, we examined performance separately for children with foster care experience, defined as those with a MAX eligibility code for foster care in their last month within the study period.[1] This population included children receiving adoption benefits and older youth who have aged out of the foster care system. It also includes children who are placed in group- and other out-of-home arrangements.

Measure Descriptions

Table 1 describes the measure specifications during testing. Descriptions represent versions of the specifications after testing variations of certain components and receiving stakeholder feedback to assist with defining the measures. Continuous enrollment and qualifying antipsychotic medication events varied by measure. In general, measures assessed three areas: potential overuse, management of children newly prescribed antipsychotics, and management of children with ongoing use of antipsychotics.

[1]The MAX eligibility codes standardize and combine codes reported by the states in the Medicaid Statistical Information System.

Table 1. Testing Specifications by Measure

	Measure Name	Continuous Enrollment	Denominator	Numerator	Exclusions
Appropriateness/Overuse Measures†	Use of Antipsychotic Medications in Very Young Children	30 days or more	0 to 5 years during the measurement year	1 or more antipsychotic prescriptions during the measurement year	None
	Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics	3 months or more	0 to 20 years with an antipsychotic prescription during the measurement year	2 or more antipsychotic prescriptions with Higher-than-Recommended doses	Dually eligible for Medicaid and Medicare
	Use of Multiple Concurrent Antipsychotics in Children and Adolescents	3 months or more	0 to 20 years with 90 days or more of continuous antipsychotic treatment during the measurement year	2 or more concurrent antipsychotic prescriptions for 90 days or more	Dually eligible for Medicaid and Medicare
Management Measures‡	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics	4 months prior and 1 month following the new script	0 to 20 years without a primary indication for antipsychotics and with a new antipsychotic prescription during the measurement year	1 or more psychosocial visits within 90 days prior to or 30 days after a new antipsychotic prescription	Dually eligible for Medicaid and Medicare
	Follow-up Visit for Children and Adolescents on Antipsychotics	4 months prior and 1 month following the new script	0 to 20 years with a new antipsychotic prescription during the measurement year	1 or more visits with a prescriber within 30 days after a new antipsychotic prescription	Dually eligible for Medicaid and Medicare and those with inpatient behavioral health claims during the 30 days after the index prescription start date
	Metabolic Screening for Children and Adolescents Newly on Antipsychotics	4 months prior and 1 month following the new script	0 to 20 years with a new antipsychotic prescription during the measurement year	Both blood glucose and lipids screening within 90 days prior to 15 days after a new antipsychotic prescription	Dually eligible for Medicaid and Medicare
	Metabolic Monitoring for Children and Adolescents on Antipsychotics	12 months with a 1 month allowable gap	0 to 20 years with two or more separate days of antipsychotic prescriptions during the measurement year	Both blood glucose and lipids screening during the measurement year	Dually eligible for Medicaid and Medicare

†A lower rate indicates better performance

‡A higher rate indicates better performance

II. ELIGIBLE POPULATION AND PERFORMANCE RATES RESULTS

Eligible Population

We assessed the eligible population (i.e. denominator) to determine whether each measure met the minimum number to achieve an acceptable level of reliability (further detailed in *Section C. Reliability Results*). Note that in implementation, minimum denominator sizes may vary according to specific program requirements. For example, for health-plan measures used in HEDIS®[2], the minimum denominator requirement is 30 health plan members.

For nearly all of the measures, both mean and median denominator sizes across states (Table 2a) and Medicaid health plans (Table 2b) exceeded the minimum required to achieve acceptable reliability levels. Commercial plans had lower denominator sizes (Table 2c).

- All states had the minimum denominator size required for all measures.
- Half of the NY Medicaid plans in the sample achieved the minimum denominator size for the *Higher-than-Recommended Doses* measure, and most plans achieved the minimum for the *Follow-Up Visit* and *Metabolic Screening* measures. Most of the plans in the sample failed to achieve the minimum for the *Multiple Concurrent Antipsychotics* measure.
- Among commercial plans, the mean denominator size was often lower than the minimum required to achieve reliability according to our model. However, most commercial plans were able to achieve the minimum denominator size of 30 needed to report HEDIS measures for the *Higher-than-Recommended Doses* and *Follow-Up Visit* measures, and at least half of the plans had the minimum for the remaining measures in the set.

[2] Healthcare Effectiveness Data and Information Set (HEDIS) is composed of performance measures for health plan reporting to the National Committee for Quality Assurance.

Table 2a: Denominator Size Distribution Across States: General Population

	Use of Antipsychotic Medications in Very Young Children	Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics	Use of Multiple Concurrent Antipsychotics in Children and Adolescents	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics*	Follow-up Visit for Children and Adolescents on Antipsychotics**	Metabolic Screening for Children and Adolescents Newly on Antipsychotics	Metabolic Monitoring for Children and Adolescents on Antipsychotics
Min Denom Size Needed‡	822	871	250	62	142	90	44
Mean	418,393	15,185	11,456	832	3,180	4,261	13,537
Min	37,138	2,012	1,545	269	478	510	1,784
25th	126,278	7,514	5,951	371	1,601	1,633	6,272
Median	265,072	14,337	10,393	1,990	3,443	3,856	12,372
75th	482,333	20,744	15,569	1,350	4,100	6,196	18,684
Max	1,703,436	31,638	24,161	33,76	6,181	9,323	28,997

* AZ, CA and NY were excluded due to data quality issues in the MAX 2008 data.
** CA and NY were excluded due to data quality issues in the MAX 2008 data.
‡ Minimum Denominator Size is calculated as the number required to achieve a reliability of 0.7 based on the Beta Binomial Model

Table 2b. Denominator Size Distribution Across 17 NY State Medicaid Health Plans†

	Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics	Use of Multiple Concurrent Antipsychotics in Children and Adolescents	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics	Follow-up Visit for Children and Adolescents on Antipsychotics	Metabolic Screening for Children and Adolescents Newly on Antipsychotics	Metabolic Monitoring for Children and Adolescents on Antipsychotics
Min Denom Size Needed‡	613	1018	38	81	71	36
Mean	1,125	783	501	626	626	834
Min	177	123	53	66	66	125
25th	426	319	133	177	177	306
Median	985	680	426	592	592	748
75th	1,480	976	749	939	939	1,082
Max	3,541	2,582	1,384	1,719	1,719	2,437

† Due to feasibility and stakeholder concerns, the *Use of Antipsychotic Medications in Very Young Children* measure is not proposed for health plans.
‡ Minimum Denominator Size is calculated as the number required to achieve a reliability of 0.7 based on the Beta Binomial Model.

Table 2c. Denominator Size Distribution Across 73 Commercial Health Plans Nationwide†

	Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics	Use of Multiple Concurrent Antipsychotics in Children and Adolescents	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics	Follow-up Visit for Children and Adolescents on Antipsychotics	Metabolic Screening for Children and Adolescents Newly on Antipsychotics	Metabolic Monitoring for Children and Adolescents on Antipsychotics
Min Denom Size Needed‡	--	754	77	107	173	144
Mean	271	169	81	105	74	215
Min	1	1	1	2	1	1
25th	36	21	25	30	13	27
Median	161	100	53	67	45	131
75th	338	209	93	121	94	272
Max	2313	1566	387	506	542	1870

† Due to feasibility and stakeholder concerns, the *Use of Antipsychotic Medications in Very Young Children* measure is not proposed for health plans.
‡ Minimum Denominator Size is calculated as the number required to achieve a reliability of 0.7 based on the Beta Binomial Model.

Performance Rates

We calculated performance rates for each measure to assess whether rates varied across reporting entities; whether there were gaps in care, which implies room for improvement; and whether there were any implausible results, which may suggest a flaw in the specifications. We presented results to our advisory panels to assist with the last question (described in individual measure submission forms). Performance rates across the measures in the set are presented here.

We found that performance rates varied across entities, though the pattern of performance was similar across measures at the plan- and state-levels. We show rates separately for the Appropriateness/Overuse measures, for which lower rates indicate better performance, and the Management measures, for which higher rates indicate better performance.

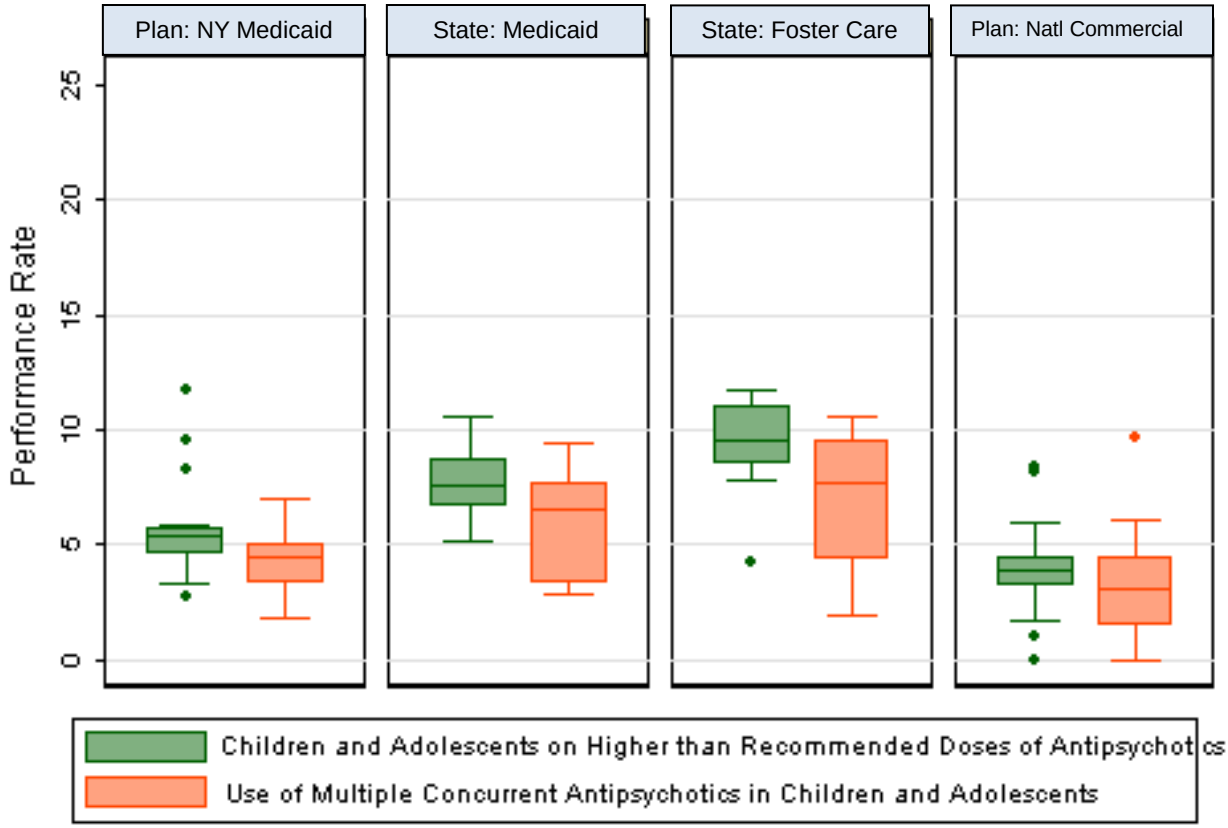
Appropriateness/Overuse Measures (Figure 1a-1b)

Among NY Medicaid plans (Figure 1a), all the appropriateness/overuse measures (lower rates indicate better performance) had mean rates below 10 percent. The mean for the *Higher-than-Recommended Doses* measure was 5.7 percent, and the mean for the *Multiple Concurrent* measure was 4.4 percent. There was greater variability among plans for the *Multiple Concurrent Antipsychotics* measure compared to the *Higher-than-Recommended Doses* measure. Among commercial plans, rates were slightly lower (i.e. better).

Similar to the plan results, among states (Figure 1a), the appropriateness/overuse measures had mean rates below 10 percent for the general population: the *Higher-than-Recommended Doses* mean was 7.9 percent, and the *Multiple Concurrent* mean was 6.0 percent. Results were slightly higher (i.e., worse) for children and adolescents with foster care experience, though rates were still below 10 percent: the *Higher-than-Recommended Doses* mean was 9.2 percent, and the *Multiple Concurrent* mean was 6.8 percent. Again, there was greater variability among plans for the *Multiple Concurrent* measure compared to the *Higher-than-Recommended Doses* measure.

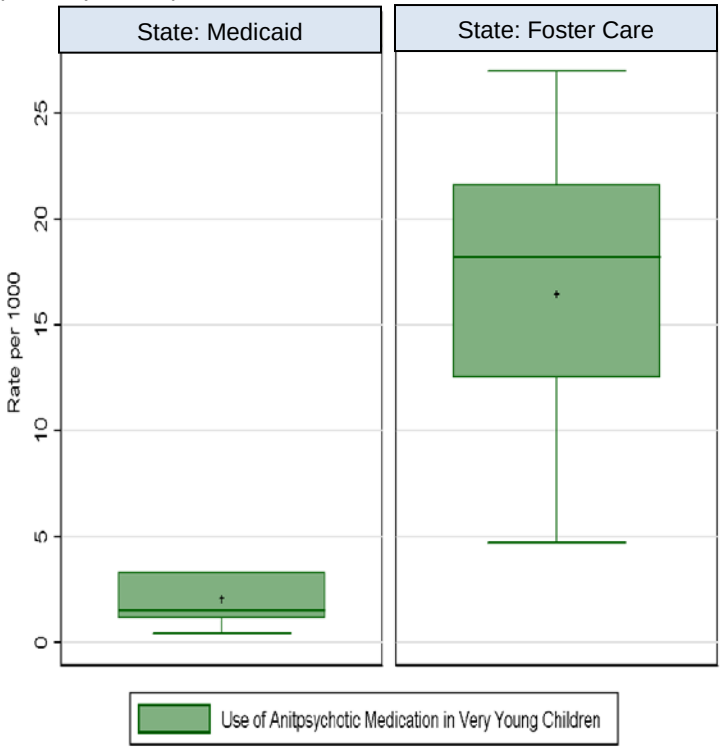
The *Use of Antipsychotics in Very Young Children* measure (Figure 1b), which is not being proposed in health plans, showed fairly low rates in states: in the general population, the rate was 2 per 1000; among children and adolescents with foster care experience, the rate was 17 per 1000.

Figure 1a: Performance Distribution on Appropriateness/Overuse Measures: *Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics* and *Use of Multiple Concurrent Antipsychotics in Children and Adolescents*†



† A lower rate indicates better performance

Figure 1b: Performance Distribution on Appropriateness/Overuse Measures: *Use of Antipsychotics in Very Young Children*†
(In Rate per 1000)

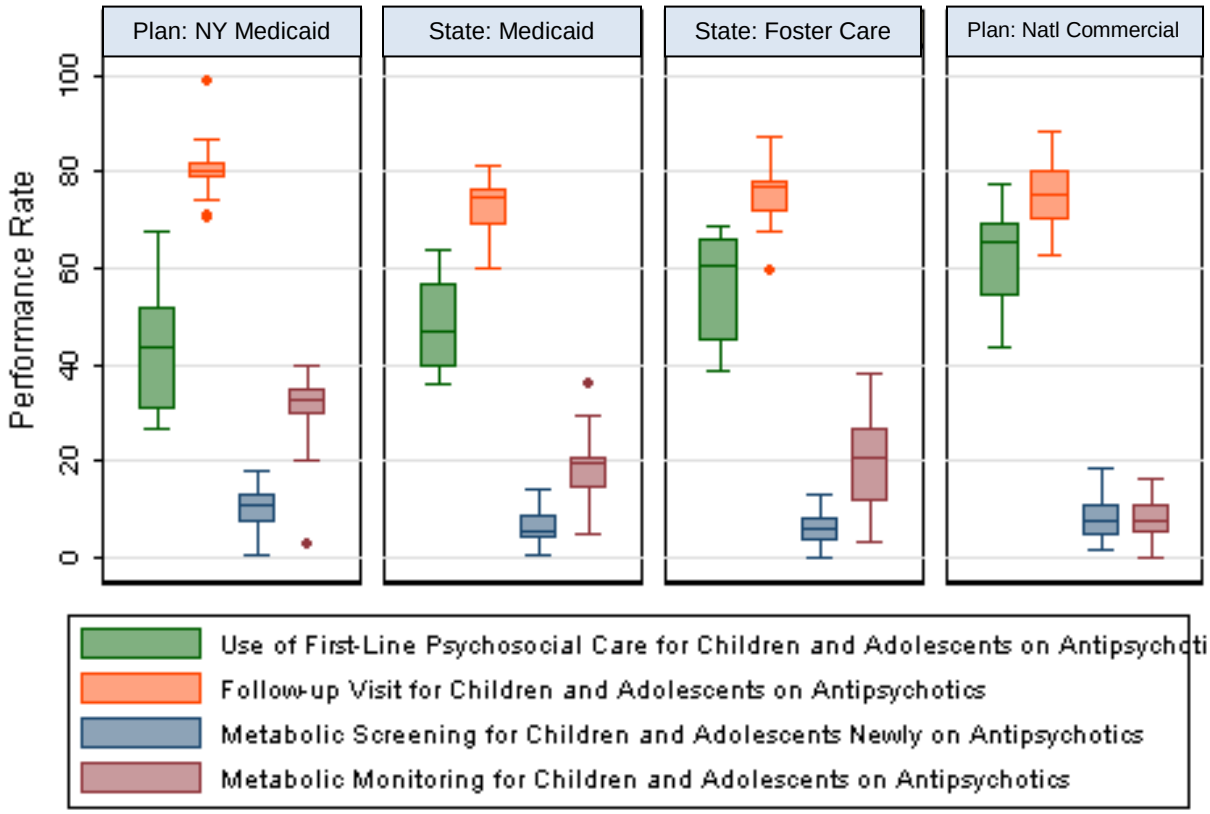


† A lower rate indicates better performance

Management Measures (Figure 2)

Among the management measures (higher rates indicate better performance), performance varied across measures, though the patterns were consistent across the different reporting entities. In general, plans and states performed best on the *Follow-Up Visit* measure and worst on the *Metabolic Screening* measure, though commercial plans performed worst on both the *Metabolic Screening* and *Metabolic Monitoring* measures. The measure with the greatest variability was the *Use of First-Line Psychosocial Care* measure across all entities.

Figure 2: Performance Distribution on Management Measures‡



‡ A higher rate indicates better performance.

Performance Among MEDNET States

In order to assess performance among states using more recent data, we supplemented our MAX 2008 analysis by calculating performance rates among three states participating in the MEDNET project: one state using 2012 data and two states using 2011 data. Tables 2d and 2e show individual state-level performance per measure broken down by age groups.

Table 2d: Performance Distribution on Appropriateness/Overuse Measures†: MEDNET States by Age Group (2011 and 2012)‡

		Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics (%)	Use of Multiple Concurrent Antipsychotics in Children and Adolescents (%)
State 1 (2012)	0-5	2.4	0.7
	6-11	9.7	2.7
	12-17	5.1	4.6
	Total 0-17	7.0	3.4
State 2 (2011)	0-5	1.9	0.0
	6-11	7.2	2.7
	12-17	5.1	4.7
	Total 0-17	5.8	3.9
State 3 (2011)	0-5	2.0	1.0
	6-11	7.7	2.1
	12-17	4.7	4.1
	Total 0-17	5.7	3.0

† A lower rate indicates better performance

‡ Calculated for ages 0-17

Table 2e: Performance Distribution on Appropriateness/Overuse Measures†: MEDNET States by Age Group (2011 and 2012)‡

		Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics (%)	Follow-up Visit for Children and Adolescents on Antipsychotics (%)	Metabolic Screening for Children and Adolescents Newly on Antipsychotics (%)	Metabolic Monitoring for Children and Adolescents on Antipsychotics (%)
State 1 (2012)	0-5	52.0	74.2	1.8	5.3
	6-11	58.0	75.8	1.3	7.8
	12-17	48.4	75.1	2.9	11.0
	Total 0-17	53.1	75.3	2.1	9.4
State 2 (2011)	0-5	28.0	64.0	6.3	15.6
	6-11	41.5	64.5	6.6	29.3
	12-17	42.7	62.4	7.7	30.0
	Total 0-17	41.4	63.4	7.2	29.5
State 3 (2011)	0-5	35.2	52.1	3.5	10.7
	6-11	37.1	54.3	5.6	17.8
	12-17	35.8	53.4	8.6	26.2
	Total 0-17	36.3	53.6	6.7	21.5

† A higher rate indicates better performance

‡ Calculated for ages 0-17

III. RELIABILITY AND VALIDITY RESULTS

Reliability

We estimated reliability with a beta-binomial model (Adams, 2009). This model measures the proportion of total variation attributable to a reporting entity, which represents the *signal*, and the proportion of variation attributable to measurement error for each entity, which represents the *noise*. The reliability of the measure is represented as the ratio of signal to noise. A score of zero implies that all the variability in a measure is attributable to measurement error. A score of 1.0 implies that all the variability is attributable to real differences in performance. The higher the reliability score, the greater is the confidence with which one can distinguish the performance of one reporting entity from another. A score of 0.7 or higher indicates adequate reliability to distinguish performance between two entities and is considered acceptable.

All measures achieved reliability scores above 0.7 for both state- and plan-level reliability, with the exception of the *Use of Multiple Concurrent Antipsychotics* measure at the plan-level (Table 3). Overall, the measures had higher levels of reliability in the state data compared to the health plan data.

Table 3a: Reliability of Child and Adolescent Antipsychotic Measures, MAX States and NY Medicaid Health Plans†

	MAX States			Medicaid Health Plan		
Measure Name	Average Reliability	Minimum Reliability	# Needed for Reliability of 0.70	Average Reliability	Minimum Reliability	# Needed for Reliability of 0.70
Use of Antipsychotic Medications in Very Young Children	0.99	NA	822	NA‡		
Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics	0.98	0.85	871	0.87	0.51	613
Use of Multiple Concurrent Antipsychotics in Children and Adolescents	0.99	0.96	250	0.64	0.28	1018
Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics	0.99	0.91	62	0.97	0.77	38
Follow-up Visit for Children and Adolescents on Antipsychotics	0.98	0.89	142	0.95	0.66	81
Metabolic Screening for Children and Adolescents Newly on Antipsychotics	0.99	0.93	90	0.95	0.69	71
Metabolic Monitoring for Children and Adolescents on Antipsychotics	0.99	0.99	44	0.98	0.89	36

† Reliability was estimated using the beta-binomial model. A reliability score of 0.7 or higher is considered acceptable.

‡ Due to feasibility and stakeholder concerns, the *Use of Antipsychotic Medications in Very Young Children* measure is not proposed for health plans, and results are not presented.

Construct Validity

In addition to face validity (results described in each measure's candidate measure submission form), we assessed construct validity, which considers whether measures are capturing important aspects of a quality concept. We conducted two types of analyses: correlations among measures and rankings of health plans and states on measures. The analyses and results are described below.

Correlations Among Measures

This analysis considers the strength of correlation in performance on measures across the set. The analysis also enables us to understand whether specific measures are addressing unique aspects of care. We present Spearman rank correlations for each measure pair. We focused on health plans, as there were low numbers of observations for states.

- Among NY Medicaid plans (Table 3b)
  - There was moderate negative correlation between the *Metabolic Screening* and *Higher-than-Recommended Doses* measures (r=-0.56, p=0.02), indicating plans that performed well on metabolic screening (higher rates indicate better performance) also performed well on avoiding higher-than-recommended dosing (lower rates indicate better performance).
  - There was a strong positive correlation between the *Metabolic Screening* and *Metabolic Monitoring* measures (r=0.72, p=0), indicating plans that perform well on initial screenings also perform well on ongoing monitoring.
  - There was an unexpected moderate negative correlation between the *Metabolic Screening* and *Psychosocial Care* measures (r=0.55, p=0.02), suggesting plans that perform well on screening did not perform well on offering first-line psychosocial care.
- Among national commercial plans (Table 3c)
  - There was moderate negative correlation between the *Follow-up Visit* and *Multiple Concurrent* measures (r=-0.58, p=0.02), suggesting plans that performed well on providing follow-up visits also performed well on avoiding multiple concurrent prescribing.
  - There was moderate positive correlation between the *Follow-up Visit* and *Psychosocial Care* measures (r=0.59, p=0.03) suggesting plans that performed well on providing follow-up visits also performed well on providing first-line psychosocial care.
  - Similar to the Medicaid plans, there was high positive correlation between the *Metabolic Screening* and *Metabolic Monitoring* measures (r=0.82, p<0.0001).

Table 3b: Correlations Among Child and Adolescent Antipsychotic Measures: NY Medicaid Health Plans[1]

	Use of Higher-than-Recommended Doses of Antipsychotics in Children and Adolescents†	Use of Multiple Concurrent Antipsychotics in Children and Adolescents†	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics‡	Follow-up Visit for Children and Adolescents on Antipsychotics‡	Metabolic Screening for Children and Adolescents Newly on Antipsychotics‡	Metabolic Monitoring for Children and Adolescents on Antipsychotics‡
Use of Higher-than-Recommended Doses of Antipsychotics in Children and Adolescents†	1	0.15	0.04	0.24	**-0.56**	-0.45
Use of Multiple Concurrent Antipsychotics in Children and Adolescents†		1	-0.33	0.18	0.12	0.01
Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics‡			1	0.13	**-0.55**	-0.27
Follow-up Visit for Children and Adolescents on Antipsychotics‡				1	0	0.14
Metabolic Screening for Children and Adolescents Newly on Antipsychotics‡					1	**0.72**
Metabolic Monitoring for Children and Adolescents on Antipsychotics‡						1

[1] Correlations calculated using Spearman Correlation Coefficients, Prob>|r| under H0: Rho=0; statistically significant correlations shown in bold text.
† A lower rate indicates better performance
‡ A higher rate indicates better performance

Table 3c: Correlations Among Child and Adolescent Antipsychotic Measures: National Commercial Health Plans[1]

	Use of Higher-than-Recommended Doses of Antipsychotics in Children and Adolescents†	Use of Multiple Concurrent Antipsychotics in Children and Adolescents†	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics‡	Follow-up Visit for Children and Adolescents on Antipsychotics‡	Metabolic Screening for Children and Adolescents Newly on Antipsychotics‡	Metabolic Monitoring for Children and Adolescents on Antipsychotics‡
Use of Higher-than-Recommended Doses of Antipsychotics in Children and Adolescents†	1.00	-0.01	0.33	0.24	-0.27	-0.03
Use of Multiple Concurrent Antipsychotics in Children and Adolescents†		1.00	-0.40	**-0.58**	0.03	0.20
Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics‡			1.00	**0.59**	0.18	0.12
Follow-up Visit for Children and Adolescents on Antipsychotics‡				1.00	0.06	0.09
Metabolic Screening for Children and Adolescents Newly on Antipsychotics‡					1.00	**0.82**
Metabolic Monitoring for Children and Adolescents on Antipsychotics‡						1.00

[1] Correlations calculated using Spearman Correlation Coefficients, Prob>|r| under H0: Rho=0; statistically significant correlations shown in bold text.
† A lower rate indicates better performance
‡ A higher rate indicates better performance

In addition to assessing correlations among the measures in this set, we examined correlations between performance on the measures and rates of hospitalization for mental health and substance use problems. However, we did not find consistent correlations.

Rankings on Measures

Among the NY Medicaid plans and MAX states, we assessed whether entities that manage one aspect of antipsychotic prescribing for children and adolescents well also manage other aspects of care well. We present Medicaid plan and state results per measure and highlight in *green* entities with the two highest rates and in *red* entities with the two lowest rates.

The results show that plans and states can be approximately ranked based on profiles of performance across multiple measures. The consistency of performance across measures suggest the measures are assessing a dimension of quality.

MAX States (Tables 3d-3e)

We found good consistency in the states with the best and worst performance on measures. For example:

- The state of AZ was one of the best performers on six of seven measures; CA was the best performer on only three of seven measures and the worst on one (note, neither was included in the *Psychosocial Care* measure).
- For youth with foster care experience, RI was worst on four of seven measures.

NY Medicaid Plans (Table 3f)

We found good consistency in the plans with the best and worst performance on measures. For example:

- One plan was one of the worst performers on four of six measures and the best performer on no measures.
- Another plan was the worst performer on no measures and the best performer on four of six measures.

Table 3d. MAX State Performance Rankings on the Child and Adolescent Antipsychotic Measures Set: General Population[1]

	Use of Antipsychotic Medications in Very Young Children† %	Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics† %	Use of Multiple Concurrent Antipsychotics in Children and Adolescents† %	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics‡** %	Follow-up Visit for Children and Adolescents on Antipsychotics‡ ** %	Metabolic Screening for Children and Adolescents Newly on Antipsychotics‡ %	Metabolic Monitoring for Children and Adolescents on Antipsychotics‡ %
IN	0.3	7.0	5.7	36.7	60.2	2.6	14.2
MO	0.3	7.6	6.6	35.8	68.4	4.5	19.4
KS	0.3	8.7	9.4	60.3	75.0	5.5	20.6
GA	0.2	7.6	7.7	48.9	71.2	3.8	6.5
RI	0.1	5.1	3.3	45.0	74.9	0.4	4.8
KY	0.3	10.6	2.9	64.1	76.4	4.8	18.7
MI	0.2	6.7	8.1	41.5	69.0	6.3	20.0
NY	0.1	8.5	7.1	NA	NA	5.3	14.8
CA	0.0	10.1	7.7	NA	NA	10.7	29.1
NM	0.1	8.1	4.1	53.3	81.3	8.3	19.6
AZ	0.1	6.7	3.0	NA	78.8	14.0	36.2
MEAN	0.2	7.9	6.0	48.2	72.8	6.0	18.5

[1] Red cells indicate the two worst performers on each measure; green cells indicate the two best. Plans are ranked from those who performed worst on the most measures to those who performed best on the most measures.

† A lower rate indicates better performance

‡ A higher rate indicates better performance

* AZ, CA and NY were excluded due to data quality issues in the MAX 2008 data

** CA and NY were excluded due to data quality issues in the MAX 2008 data

Table 3e. MAX State Performance Rankings on the Child and Adolescent Antipsychotic Measures Set: Foster Care Population[1]

	Use of Antipsychotic Medications in Very Young Children† %	Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics† %	Use of Multiple Concurrent Antipsychotics in Children and Adolescents† %	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics‡* %	Follow-up Visit for Children and Adolescents on Antipsychotics‡** %	Metabolic Screening for Children and Adolescents Newly on Antipsychotics‡ %	Metabolic Monitoring for Children and Adolescents on Antipsychotics‡ %
KS	2.7	9.5	10.6	63.9	76.1	7.3	25.3
MI	1.7	9.6	9.5	38.8	59.2	7.0	25.1
IN	2.3	8.8	8.2	57.5	67.4	4.4	18.2
RI	0.8	4.2	4.5	40.0	71.3	0.0	7.2
GA	1.9	9.7	10.0	68.9	77.1	2.2	3.0
NM	1.3	7.8	4.4	49.3	83.2	8.0	17.5
MO	2.0	11.3	9.2	65.0	77.2	5.8	26.7
KY	2.2	11.0	2.9	67.1	77.9	6.0	20.7
AZ	1.3	8.5	1.9	NA	87.6	12.2	38.1
CA	0.5	11.7	7.1	NA	NA	13.2	34.6
NY***	NA	NA	NA	NA	NA	NA	NA
MEAN	1.7	9.2	6.8	56.3	75.2	6.3	20.7

[1] Red cells indicate the two worst performers on each measure; green cells indicate the two best. Plans are ranked from those who performed worst on the most measures to those who performed best on the most measures.

† A lower rate indicates better performance

‡ A higher rate indicates better performance

* AZ, CA and NY were excluded due to data quality issues in the MAX 2008 data

** CA and NY were excluded due to data quality issues in the MAX 2008 data

*** NY was excluded from all measures for the foster care population, as NY data are limited to foster care populations in residential settings only

Table 3f. NY Medicaid Health Plan Performance Rankings on the Antipsychotics Measures Set[1]

	Children and Adolescents on Higher-than-Recommended Doses of Antipsychotics[†] %	Use of Multiple Concurrent Antipsychotics in Children and Adolescents[†] %	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics[‡] %	Follow-up Visit for Children and Adolescents on Antipsychotics[‡] %	Metabolic Screening for Children and Adolescents Newly on Antipsychotics[‡] %	Metabolic Monitoring for Children and Adolescents on Antipsychotics[‡] %
Plan 3	11.7	3.8	41.7	71.0	0.2	2.3
Plan 9	8.3	7.0	48.6	81.8	4.9	30.8
Plan 6	4.9	6.6	30.1	83.5	12.3	34.0
Plan 17	9.6	3.3	26.4	86.7	14.8	39.7
Plan 2	4.4	5.1	27.4	80.5	15.4	38.8
Plan 8	5.4	4.6	43.5	81.1	12.6	35.0
Plan 4	5.8	3.3	46.9	78.7	9.3	28.4
Plan 5	4.9	3.9	42.4	80.0	10.6	33.8
Plan 1	5.6	5.6	51.6	82.1	12.8	36.0
Plan 11	5.7	5.1	43.8	74.4	6.1	29.1
Plan 16	4.0	3.3	56.6	78.8	10.6	31.2
Plan 15	5.7	6.3	28.0	80.9	10.8	30.4
Plan 12	4.7	4.3	43.3	77.2	13.3	34.7
Plan 13	3.3	4.5	30.7	70.4	17.8	32.5
Plan 7	4.6	2.3	67.7	85.3	5.1	20.3
Plan 14	5.4	4.6	64.3	98.7	7.1	27.9
Plan 10	2.7	1.8	67.0	78.9	10.6	40.0
MEAN	5.7	4.4	44.7	80.6	10.3	30.9

[1] Red cells indicate the two worst performers on each measure; green cells indicate the two best. Plans are ranked from those who performed worst on the most measures to those who performed best on the most measures.

[†] A lower rate indicates better performance

[‡] A higher rate indicates better performance

IV. SUMMARY OF OVERALL FIELD TEST FINDINGS

Overall, our analyses suggest this set of antipsychotic measures is feasible for plans and states (with the exception of the *Very Young* measure, which we are not proposing for plans), presents opportunities for improvement, and is scientifically sound. The majority of plans and states in our sample had adequate eligible population to report each measure. Performance rates varied across the measures, with some measures showing more opportunities for improvement than others. Results were consistent across different reporting entities and years. Measures demonstrated consistency across one another and an ability to distinguish high- and low-performing entities. The table below summarizes analysis findings for each measure.

Table 4. Summary of Analysis Results by Measure

	Measure Name	Eligible Population[1]	Performance	Scientific Soundness
Appropriateness/Overuse Measures[†]	Use of Antipsychotic Medications in Very Young Children[2]	° All states in the sample exceeded the minimum	° For this *lower is better* measure, state performance rates were extremely low (mean <1%) ° We are not proposing the measure for plans	Reliability ° Highly reliable at the state level Validity ° State-level correlations were hindered by small numbers of observations ° Rankings analysis showed good consistency in both Medicaid plans and states for the set of measures
	Use of Higher-than-Recommended Doses of Antipsychotics in Children and Adolescents	° At least half of Medicaid plans in the sample exceeded the minimum ° Mean denominator sizes were often lower than the minimum required ° All states in the sample exceeded the minimum	° For this *lower is better* measure, Medicaid and commercial plan performance rates were fairly low (mean below 10%) with very low variability ° State performance rates were fairly low (mean below 10%) with very low variability among states	Reliability ° Fairly reliable at the plan level ° Highly reliable at the state level Validity ° Medicaid plan-level correlations showed moderate negative correlation with the *Metabolic Screening* measure, suggesting plans that do well on this screening also avoid prescribing higher-than-recommended doses ° Rankings analysis showed good consistency in both plans and states for the set of measures
	Use of Multiple Concurrent Antipsychotics in Children and Adolescents	° Most plans in the sample failed to exceed the minimum (minimum needed=1018; plans in the 75th percentile=976) ° All states in the sample exceeded the minimum	° For this *lower is better* measure, Medicaid and commercial plan performance rates were fairly low (mean below 10%) with low variability among plans ° State performance rates were fairly low (mean below 10%) with low variability among states	Reliability ° Not reliable at the plan level ° Highly reliable at the state level Validity ° Medicaid plan-level correlations showed moderate negative correlation with the *Psychosocial Care* measure, suggesting plans that do well at providing first-line psychosocial care also avoid multiple concurrent prescriptions; however, the correlation was not statistically significant ° Commercial plan-level correlations showed moderate negative correlation with the *Follow-up Visit* measure, suggesting plans that do well at providing follow-up visits also avoid multiple concurrent prescriptions. ° Rankings analysis showed good consistency in both plans and states for the set of measures
Management Measures[‡]	Use of First-Line Psycho-social Care for Children and Adolescents on Antipsychotics	° All plans in the sample exceeded the minimum ° All states in the sample exceeded the minimum	° For this *higher is better* measure, Medicaid plan performance rates were below 50% with variability among plans, suggesting room for improvement ° Commercial plan performan rates were slightly higher though still showed room for improvement ° State rates were similar with only slightly less variability, suggesting room for improvement	Reliability ° Highly reliable at both the plan- and state levels Validity ° Medicaid plan-level correlations showed moderate negative correlation with the *Metabolic Screening* measure, suggesting plans that do well at providing first-line psychosocial care also do well at metabolic screening in youth with new prescriptions ° Commercial plan-level correlations showed moderate positive correlation with the *Follow-up Visit* measure, suggesting plans that do well at providing follow-up visits also do well at providing first-line psychosocial care ° Rankings analysis showed good consistency in both plans and states for the set of measures

	Measure Name	Eligible Population[1]	Performance	Scientific Soundness
	Follow-up Visit for Children and Adolescents on Antipsychotics	° At least three-quarters of plans in the sample exceeded the minimum ° All states in the sample exceeded the minimum	° For this *higher is better* measure, Medicaid and commercial plan performance rates were high with low variability ° State performance rates were similarly good but with more variability, suggesting room for improvement	Reliability ° Highly reliable at both the plan- and state levels Validity ° Medicaid Plan-level correlations showed no significant correlations with other measures in the set ° Commercial plan-level correlations showed moderate negative correlation with the *Follow-up Visit* measure, suggesting plans that do well at providing follow-up visits also avoid multiple concurrent prescriptions. ° Commercial plan-level correlations also showed moderate positive correlation with the *Follow-up Visit* measure, suggesting plans that do well at providing follow-up visits also do well at providing first-line psychosocial care ° Rankings analysis showed good consistency in both plans and states for the set of measures
	Metabolic Screening for Children and Adolescents Newly on Antipsychotics	° At least three-quarters of plans in the sample exceeded the minimum ° All states in the sample exceeded the minimum	° For this *higher is better* measure, Medicaid and commercial plan performance rates were very low with moderate variability among plans, suggesting much room for improvement ° State performance rates were similarly poor with moderate variability, suggesting room for improvement	Reliability ° Highly reliable at both the plan- and state levels Validity ° Medicaid plan-level correlations showed moderate negative correlation with *Higher-than-Recommended Doses* measure, suggesting plans that do well on metabolic screening also do well at avoiding prescribing higher-than-recommended doses in youth ° Medicaid plan-level correlations also showed moderate negative correlation with the *Psychosocial Care* measure, suggesting plans that do well at providing first-line psychosocial care also do well at metabolic screening in youth with new prescriptions ° Medicaid plan-level correlations also showed strong positive correlation with the *Metabolic Monitoring* measure, suggesting plans that do well at screening youth with new prescriptions also do well at monitoring youth with ongoing prescriptions ° Similarly, commercial plan-level correlations showed strong correlation with the *Metabolic Monitoring* measure ° Rankings analysis showed good consistency in both plans and states for the set of measures
	Metabolic Monitoring for Children and Adolescents on Antipsychotics	° All plans in the sample exceeded the minimum ° All states in the sample exceeded the minimum	° For this *higher is better* measure, Medicaid plan performance rates were higher than screening rates yet still low (mean 30%) with moderate variability among plans, suggesting room for improvement ° Commercial plan performance rates were much lower compared to Medicaid plans ° State performance rates were worse (mean 20%) with moderate variability, suggesting room for improvement	Reliability ° Highly reliable at the plan- and state levels Validity ° Medicaid plan-level correlations showed strong positive correlation with the *Metabolic Screening* measure, suggesting plans that do well at screening youth with new prescriptions also do well at monitoring youth with ongoing prescriptions ° Similarly, commercial plan-level correlations showed strong correlation with the *Metabolic Screening* measure ° Rankings analysis showed good consistency in both plans and states for the set of measures

† A lower rate indicates better performance

‡ A higher rate indicates better performance

[1] Minimum denominator size needed to achieve an acceptable reliability score

[2] Due to feasibility and stakeholder concerns, the *Use of Antipsychotic Medications in Very Young Children* measure is not proposed for health plans