



RRIP – Patient Adversity Index and Disparity Gap for Rate Year 2024

By HSCRC, last updated 6/27/2022

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Patient Adversity Index and Disparity Gap

This is a user guide specifically for the Patient Adversity Index and Disparity Gap report, used to track within-hospital disparities in readmission rates. For more information about the PAI policy, please visit the [RRIP Final Policy](#).

Background

Racial and socioeconomic differences in readmission rates are well documented^{1,2} and are a source of significant concern. Many Maryland hospitals, as well as the Maryland Hospital Association, identify reduction in readmission disparities as a key priority over the near term. Thus, staff developed the Patient Adversity Index (PAI), a composite social risk index incorporating information on patient race, Medicaid status, and the Area Deprivation Index (ADI) for the area surrounding the patient's address (as recorded in claims). Staff chose, and vetted with stakeholders, these three variables because they are among the few available in claims that capture social determinants of health. Medicaid status is often used as a proxy for income. Race is included, not to reflect biological differences across races, but rather as a proxy for exposure to structural racism.³ The ADI reflects exposure to diminished access to neighborhood resources, such as health care providers, pharmacies, transportation, and gainful employment, which may impact health outcomes.

Methodology

The PAI for each patient discharge is calculated by regressing readmission status (yes or no) against Medicaid status, race (black vs. other), and ADI percentile, along with terms for interactions between each of these three variables. The result is a continuous value reflecting the patient's social exposures, weighted by the degree to which each of them is associated with readmissions. The PAI value is then converted to a standardized score which sets the statewide mean at zero and the scale so that a one-unit change is equal to a change of one standard deviation.

To measure the effect of PAI, staff developed a regression model that estimates the slope of PAI at each hospital, after controlling for patient age, gender, and APR-DRG readmission

¹ Tsai TC, Orav EJ, Joynt KE. Disparities in surgical 30-day readmission rates for Medicare beneficiaries by race and site of care. *Ann Surg.* 2014;259(6):1086-1090. doi:10.1097/SLA.0000000000000326;

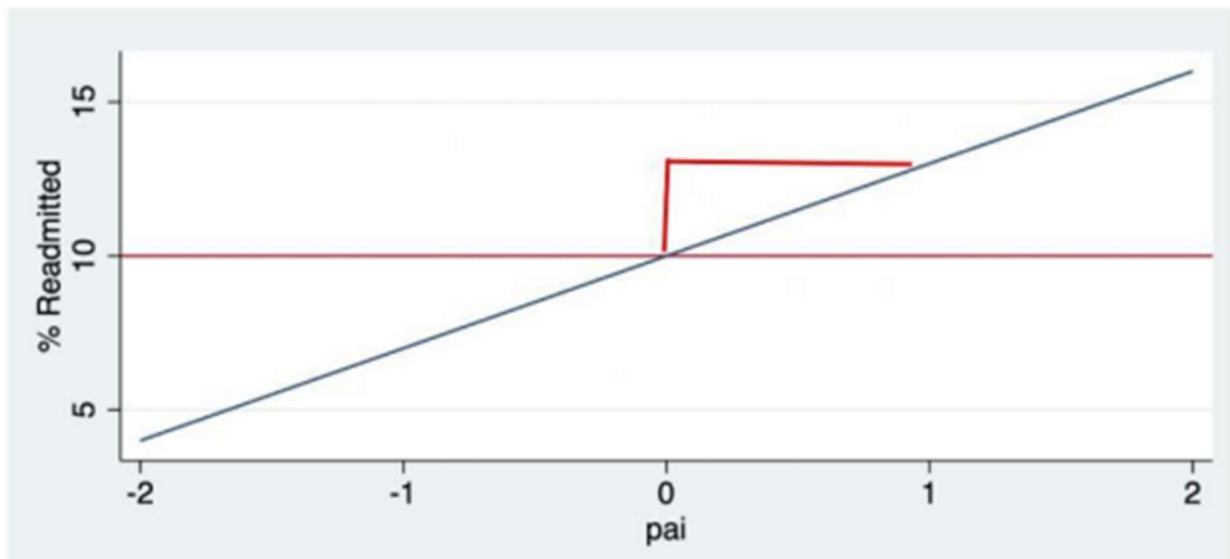
² Calvillo-King, Linda, et al. "Impact of social factors on risk of readmission or mortality in pneumonia and heart failure: systematic review." *Journal of general internal medicine* 28.2 (2013): 269-282

³ 5 Structural racism is defined as the macro-level systems, social forces, institutions, ideologies, and processes that interact with one another to generate and reinforce inequities among racial and ethnic groups (Powell JA. *Structural Racism: Building upon the Insights of John Calmore.* North Carolina Law Review. 2008;86:791-816.)



risk. Additionally, staff controlled for the average PAI value for patients at the hospital, as hospitals serving higher proportions of disadvantaged patients may face heightened challenges in reducing readmission rates. The PAI slope, or disparity gap measure, is interpreted as the difference in readmission rates at a given hospital between patients at a base (lower) level of PAI, and patients with PAI one unit higher than the base. The change in disparity gap measure from the base year (CY2018) to a given performance year (CY2020) is the performance metric.

Understanding the Disparity Measure



We use a statistical model to estimate the slope of the line connecting readmission rates at various levels of PAI within a hospital. A flat slope means there is no disparity.

Data Sources

1. Inpatient Case-mix data run under APR-DRG grouper v39
2. Out-of-state readmission rates from Medicare data obtained from CMMI

Static Reports User Guide

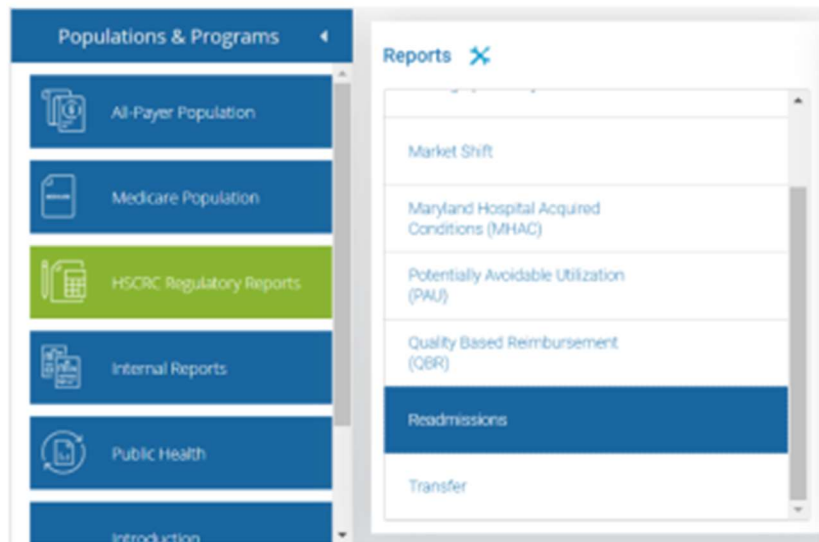
Readmission Report Access/Card

The Patient Adversity Index and Disparity Gap report can be accessed by visiting reports.crisphealth.org and logging-in with a CRS username and password.

Step 1. To access the PAI Report a user must first login to the CRISP Reporting Services Portal by visiting reports.crisphealth.org. The following screenshots represent the user's workflow.



Step 2. Once in the CRS Portal, a dashboard of different blue report "cards" will appear based on the access permissions of the user. Clicking the card named "Readmissions" will bring up the available reports for this category.



Step 3. By clicking the excel icon as shown below, you will access the most recent static summary file. An excel workbook will open with all available tabs.





PAI and Disparity Gap Reports

Sheets included in workbook:

- (1) Cover Sheet
- (2) Disparity Gap
- (3a) Medicaid
- (3b) Race
- (3c) ADI

The following metrics can be found in the PAI and Disparity Gap Report:

Metric	Description
Average PAI	Average of patient PAI values at each hospital (positive values indicate higher risk of readmission). Patient PAI measure is continuous score of readmission risk based on Medicaid status, race, and Area Deprivation Index.
Disparity Gap (slope)	The disparity gap is the percent difference between the readmission rates at PAI=0 and PAI=1, which also is equivalent to the slope of the line for readmissions across all values of PAI
Risk-Adjusted Readmission Rate	The readmission rate at PAI=0 (lower adversity) and PAI=1 (higher adversity) adjusting for APRDRG-SOI readmission risk, age, gender and hospital mean PAI.
Eligible Discharges	Discharges eligible for a readmission
Case-mix Adjusted Readmission Rate	A given hospital's expected number of readmissions based on the process of indirect standardization
Medicaid FFS & MCO	Payer 1 or 2 equals Medicaid FFS/HMO (02,14)
Non-Medicaid	Payer 1 or 2 does not equal Medicaid FFS/HMO
Black	Case-mix variable "rblack" equals 1
Non-Black	Case-mix variable "rblack" does not equal 1
High ADI	Greater than or equal to 85th ADI percentile
Low ADI	Less than 85th ADI percentile
Percent Difference in Readmission Rates	The percent difference between the readmission rates at PAI factor=0 and PAI factor=1



Cover Sheet (1)

The cover sheet provides an overview of each sheet available in the PAI and Disparity Gap Report.

RY2024 Readmissions Reduction Incentive Program (RRIP)	RY 24 Readmissions Reduction Incentive Program (RRIP)
Disparity Gap Workbook	Disparity Gap Workbook
BASE YEAR	CY2018
PERFORMANCE YEAR	CY2022 YTD Through March (Apr 2021- Mar 2022)
VERSION	APR-ORG Grouper version 39 base & performance period; ADI v. 2019 National percentiles
INCLUDED IN THIS EXCEL WORKBOOK:	Description
2. PAI and Disparity Gap by Hospital	Provides average PAI and the current disparity gap metric compared to the 2018 disparity gap metric
3. Patient Sociodemographics by Hospital	Descriptive statistics for PAI components of patients seen at each hospital by year
3a. Medicaid	Readmission rates for Medicaid and non-Medicaid
3b. Race	Readmission rates for Blacks and non-Blacks
3c. ADI	Readmission rates by Area Deprivation Index

Disparity Gap (2)

The Disparity Gap sheet provides average PAI and the current disparity gap metric compared to the 2018 disparity gap metric by hospital by year.

Disparity Gap by Hospital

Average PAI: Average of patients PAI scores at each hospital (positive values indicate higher risk of readmission). Patients PAI measure is continuous score (Disparity Gap Metric). This is the performance metric that will be used to determine disparity rewards (required improvement in Disparity Gap and Risk-Adjusted Readmission Rate). These are the readmission rates at PAI=0 (lower admission) and PAI=1 (higher admission) adjusting for APR-ORG ADI

HOSPITAL ID	HOSPITAL NAME	Performance Metric Percent Change in Disparity Gap Metric vs 2018 PAI	CY2022 (Rolling 12 month Performance Period)				CY2018				CY2020			
			Average PAI	Disparity Gap Metric	Risk-Adjusted Readmission Rate (Lower admission)	Risk-Adjusted Readmission Rate (Higher admission)	Average PAI	Disparity Gap Metric	Risk-Adjusted Readmission Rate (Lower admission)	Risk-Adjusted Readmission Rate (Higher admission)	Average PAI	Disparity Gap Metric	Risk-Adjusted Readmission Rate (Lower admission)	Risk-Adjusted Readmission Rate (Higher admission)
1		-3.20%	0.1870	0.89%	8.62%	10.88%	0.1820	0.92%	8.62%	11.88%	0.1862	0.82%	8.62%	10.88%
2		13.42%	0.3481	1.88%	8.20%	10.88%	0.1807	1.32%	8.57%	10.38%	0.2110	2.04%	8.52%	10.54%
3		14.51%	0.2228	2.72%	8.20%	10.88%	0.2082	1.72%	8.20%	9.38%	0.2077	1.52%	7.20%	10.28%
4		-4.51%	-0.1876	-1.08%	8.98%	8.98%	-0.1807	0.72%	8.57%	8.08%	-0.1888	1.08%	8.08%	8.08%
5		-3.11%	-0.1524	2.48%	7.82%	10.50%	-0.1707	2.18%	7.98%	10.42%	-0.1628	2.18%	8.21%	10.38%
6		-9.32%	-0.3130	2.88%	3.88%	11.72%	-0.3114	2.88%	3.52%	11.48%	-0.3010	2.48%	3.28%	11.72%
7		10.82%	0.4949	0.57%	7.97%	11.04%	0.4870	0.18%	7.78%	10.88%	0.4928	2.42%	7.48%	10.88%
8		18.28%	0.7107	3.08%	3.88%	11.04%	0.7100	3.78%	3.78%	11.78%	0.7100	3.18%	9.28%	11.08%
9		-8.24%	-0.1881	1.48%	8.72%	9.22%	-0.2071	1.28%	7.88%	10.28%	-0.1924	1.52%	7.42%	10.12%
10		12.28%	0.4088	2.08%	7.88%	8.98%	0.4032	1.88%	8.48%	10.88%	0.3976	2.08%	7.48%	9.42%
11		-18.41%	-0.2871	1.52%	8.62%	10.88%	-0.2968	1.78%	7.98%	10.88%	-0.2820	1.88%	8.58%	10.58%
12		-3.75%	-0.1850	2.28%	7.52%	10.28%	-0.2100	1.08%	7.28%	11.28%	-0.2090	1.12%	7.88%	10.88%
13		12.02%	0.4922	1.88%	8.88%	7.88%	0.4882	1.72%	8.28%	8.88%	0.4920	1.62%	8.48%	8.88%
14		-25.88%	-0.5427	3.28%	7.88%	10.28%	-0.5300	3.28%	7.98%	10.88%	-0.5147	3.28%	8.48%	10.58%
15		7.82%	0.4501	3.52%	7.22%	9.78%	0.4480	3.48%	7.28%	9.52%	0.4512	3.12%	8.12%	8.28%
16		10.28%	0.4788	2.88%	8.88%	10.88%	0.4888	3.28%	8.28%	10.88%	0.4888	4.08%	7.48%	11.48%
17		4.72%	-0.4118	2.08%	8.72%	11.04%	-0.4180	1.78%	7.88%	11.08%	-0.4002	2.08%	8.72%	11.08%
18		-5.08%	-0.2421	3.52%	7.88%	11.08%	-0.2320	3.28%	7.28%	11.48%	-0.2310	3.02%	7.28%	10.28%
19		20.88%	0.7528	3.08%	8.48%	8.72%	0.7488	2.82%	8.48%	8.48%	0.7582	2.48%	8.72%	8.28%
20		14.88%	-0.3828	0.52%	7.88%	10.28%	-0.3988	4.18%	4.18%	12.52%	-0.3810	3.42%	7.28%	10.88%
21		-29.88%	-0.3811	3.52%	3.42%	11.28%	-0.4028	3.22%	2.22%	11.21%	-0.3910	3.02%	3.02%	11.28%
22		-11.78%	-0.2809	1.88%	8.48%	8.48%	-0.2800	2.18%	8.42%	8.48%	-0.2808	2.51%	8.48%	8.48%
23		8.72%	-0.1927	1.18%	10.88%	10.88%	-0.1988	0.32%	7.88%	10.88%	-0.1918	2.18%	8.28%	10.88%
24		-25.88%	-0.3958	3.52%	7.52%	11.08%	-0.3880	3.22%	7.52%	11.28%	-0.3710	3.12%	7.42%	10.28%
25		19.88%	0.5270	2.88%	9.78%	10.88%	0.4881	2.82%	8.82%	11.88%	0.4877	2.72%	10.28%	10.88%
26		36.22%	-0.2870	1.52%	7.88%	8.48%	-0.2801	1.62%	7.08%	9.48%	-0.2820	1.72%	7.02%	9.18%
27		-4.82%	-0.2881	1.28%	7.28%	10.28%	-0.2810	1.88%	7.28%	10.28%	-0.2810	1.72%	7.28%	10.28%
28		-9.88%	-0.3889	1.88%	9.28%	10.88%	-0.3880	1.88%	8.52%	10.88%	-0.3888	2.22%	9.48%	11.88%
29		18.52%	0.2888	2.08%	8.28%	10.28%	0.2888	2.22%	7.52%	11.88%	0.2888	1.52%	7.28%	10.88%
30		37.82%	0.4710	3.28%	10.52%	10.28%	0.4680	3.22%	10.28%	10.52%	0.4680	3.02%	11.52%	11.52%
31		10.78%	-0.2298	2.52%	8.88%	11.08%	-0.2280	2.78%	8.88%	11.48%	-0.2310	2.72%	8.82%	11.28%
32		-11.52%	-0.4828	2.28%	8.48%	8.48%	-0.4810	2.28%	8.48%	8.48%	-0.4810	1.52%	7.48%	8.48%
33		11.52%	-0.5088	3.52%	11.52%	-0.5010	3.18%	11.88%	10.88%	-0.5010	3.52%	11.52%	11.52%	
34		29.82%	-0.4740	1.48%	7.82%	11.08%	-0.4801	1.48%	7.88%	11.12%	-0.4888	1.28%	8.12%	11.02%

Medicaid (3a)

The Medicaid sheet provides case-mix adjusted readmission rates for Medicaid and non-Medicaid beneficiaries by year.

Readmissions by Medicaid Status

Page 1 of page 2 equals Medicaid FFS/HMO (EE, 14)

HOSPITAL ID	HOSPITAL NAME	Percent Difference in Readmission Rates between Medicaid and Non-Medicaid CY2022	CY2022 (Rolling 12 month Performance Period)				CY2021			
			Medicaid FFS & HMO		Non-Medicaid		Medicaid FFS & HMO		Non-Medicaid	
			Eligible Discharges	Case-Mix Adjusted Readmission Rate	Eligible Discharges	Case-Mix Adjusted Readmission Rate	Eligible Discharges	Case-Mix Adjusted Readmission Rate	Eligible Discharges	Case-Mix Readmission
1		4.110%	4,738	14.37%	6,020	10.34%	4602	14.17%	6020	
2		1.840%	3,810	11.31%	10,202	10.67%	8740	12.38%	10340	
3		0.830%	3,058	10.10%	4,738	9.30%	3881	10.10%	4081	
4		1.660%	4,808	12.08%	10,620	11.41%	8780	12.42%	10862	
5		2.980%	2,841	12.88%	10,238	10.38%	2288	12.88%	10871	
6		0.870%	1,248	10.27%	2,140	10.24%	1261	10.88%	2198	
7		8.400%	1,988	10.88%	6,581	10.44%	1768	10.88%	6748	
8		10.980%	10,987	13.17%	21,542	10.67%	10911	13.47%	21760	
9		0.670%	3,418	11.59%	5,500	11.43%	3481	12.44%	5548	
10		2.600%	6,862	11.88%	6,388	9.64%	5884	12.40%	6342	
11		8.480%	8,718	11.84%	8,882	11.41%	8338	12.13%	8131	
12		-0.880%	3,171	11.12%	4,438	11.10%	3162	12.28%	4621	
13		12.700%	371	8.24%	1,011	8.88%	388	9.28%	1018	
14		2.840%	1,184	12.01%	3,018	9.67%	1010	12.24%	3024	
15		1.220%	4,372	11.81%	7,811	10.28%	4188	11.67%	7884	
16		2.880%	1,347	12.78%	8,117	10.18%	1421	14.15%	8221	
17		2.120%	4,182	14.32%	10,888	12.28%	4811	14.21%	17148	
18		3.810%	3,288	14.88%	4,058	10.67%	3481	14.67%	4811	
19		3.410%	1,441	11.78%	4,438	9.38%	2481	11.05%	5411	
20		5.120%	2,884	10.52%	4,448	9.88%	2848	10.88%	4281	
21		3.280%	4,888	10.18%	8,117	11.71%	4888	10.38%	6281	
22		0.180%	84	8.68%	288	4.82%	88	6.74%	282	
23		3.520%	1,888	13.78%	3,418	10.47%	1888	12.74%	3681	



Race (3b)

The Race sheet provides case-mix adjusted readmission rates for Blacks and Non-Blacks by year.

Hospitals		Percent Difference in Readmission Rates between Black and Non-Black CY2022	CY2022 (Rolling 12 month Performance Period)				CY2021			
HOSPITAL ID	HOSPITAL NAME		Black		Non-Black		Black		Non-Black	
			Eligible Discharges	Case-Mix Adjusted Readmission Rate	Eligible Discharges	Case-Mix Adjusted Readmission Rate	Eligible Discharges	Case-Mix Adjusted Readmission Rate	Eligible Discharges	Case-Mix Adjusted Readmission Rate
		-3.82%	1,344	11.87%	11,820	11.86%	11.86%	1,462	11.81%	10,993
		7.69%	6,615	11.32%	13,262	13.52%	11.53%	8,511	11.53%	10,511
		-3.72%	3,868	9.89%	2,214	9.82%	9.82%	3,887	9.89%	2,338
		13.29%	9,131	12.47%	10,347	11.81%	11.81%	8,517	12.67%	10,514
		3.19%	1,421	11.17%	11,246	10.77%	11.17%	1,465	11.17%	11,076
		-4.19%	717	12.95%	2,660	12.65%	12.41%	735	12.41%	2,733
		10.08%	4,883	13.27%	4,369	13.16%	13.16%	3,602	13.62%	4,535
		7.47%	12,633	12.27%	13,470	11.30%	11.30%	12,959	12.69%	10,259
		9.62%	4,388	11.86%	4,829	13.81%	11.71%	4,174	12.38%	4,638
		-3.95%	7,588	10.76%	4,824	11.16%	11.16%	7,444	11.59%	4,735
		-6.09%	4,171	10.83%	11,238	11.89%	11.89%	4,218	11.31%	11,283
		24.17%	2,538	12.57%	4,765	13.67%	13.67%	2,522	13.19%	4,622
		-100.00%	8	0.89%	7,382	9.94%	9.94%	8	8.03%	13,881
		34.09%	1,224	13.94%	2,370	9.66%	9.66%	1,241	13.03%	2,957
		14.73%	3,078	11.76%	8,864	13.20%	11.12%	3,362	11.12%	8,628
		6.35%	2,957	11.26%	7,467	13.46%	11.62%	2,957	11.62%	7,539
		7.19%	3,462	13.26%	19,899	12.94%	13.26%	3,412	13.26%	19,739
		1.25%	4,588	12.77%	3,525	11.87%	11.87%	4,715	12.49%	3,655
		24.72%	327	11.68%	7,444	9.34%	9.34%	312	10.82%	7,628
		21.16%	1,537	13.34%	5,897	11.61%	11.61%	1,494	13.17%	4,947
		-6.94%	3,734	12.88%	9,263	12.86%	13.34%	3,812	13.34%	8,396
		183.71%	47	9.27%	224	3.55%	6.44%	56	6.44%	234
		13.19%	844	12.76%	4,381	11.22%	13.61%	824	13.61%	4,921
		38.05%	487	15.39%	7,272	13.76%	13.69%	485	13.69%	7,174
		-6.15%	2,884	12.76%	3,827	13.51%	13.49%	2,118	13.49%	3,668
		-4.02%	2,372	10.52%	2,587	13.44%	13.27%	2,359	13.27%	2,665
		32.49%	871	11.89%	3,377	8.89%	11.89%	887	11.89%	3,384

ADI (3c)

The ADI sheet provides case-mix adjusted readmission rates by low vs high Area Deprivation Index by year

Hospitals		Percent Difference in Readmission Rates between High ADI and Low ADI CY2022	CY2022 (Rolling 12 month Performance Period)				Mean ADI		High ADI
HOSPITAL ID	HOSPITAL NAME		Mean ADI	High ADI		Low ADI		Mean ADI	Eligible Discharges
				Eligible Discharges	Case-Mix Adjusted Readmission Rate	Eligible Discharges	Case-Mix Adjusted Readmission Rate		
		-22.26%	11,244	62%	9.36%	11,828	12.64%	11,198	147
		2.76%	46,67	2,285	11.17%	16,612	10.67%	46,46	2,151
		24.12%	33,43	45	11.64%	6,218	8.62%	33,51	47
		-42.64%	28,82	72	8.34%	19,434	11.75%	28,38	88
		8.69%	29,11	18	10.69%	12,738	10.81%	29,64	21
		20.14%	43,32	24	10.26%	5,261	12.07%	39,76	27
		22.67%	10,32	1,226	10.26%	1,837	12.47%	10,46	1,264
		4.89%	42,87	3,113	12.26%	20,284	11.68%	43,37	3,171
		-8.38%	11,462	1,148	11.42%	7,888	11.46%	11,73	1,187
		7.36%	52,16	1,884	11.62%	10,528	10.79%	52,16	1,876
		3.79%	47,76	867	12.88%	14,534	11.62%	47,73	853
		-62.13%	28,81	23	8.33%	7,584	11.16%	28,31	26
		30.38%	44,23	87	8.17%	1,327	8.62%	44,36	68
		-10.17%	21,54	5	9.57%	4,138	10.67%	21,62	5
		4.41%	57,82	888	11.15%	11,414	10.66%	57,88	888
		10.43%	13,87	18	11.65%	9,448	10.16%	13,88	18
		54.93%	22,76	140	10.38%	20,828	12.64%	22,72	137
		18.63%	18,24	1,280	14.69%	7,316	12.89%	18,58	128
		-2.95%	73,12	1,448	9.22%	6,423	9.25%	73,23	1,448
		70.12%	29,54	3	10.76%	6,538	11.85%	29,51	3
		6.76%	53,86	1,408	13.71%	11,348	12.64%	53,74	1,447
		-100.00%	37,11	17	8.66%	288	4.97%	37,62	17
		-100.00%	42,84	17	8.66%	4,318	11.41%	43,12	16
		64.38%	16,10	42	17.11%	7,774	11.66%	16,16	28