ORIGINAL ARTICLE

Cardiovascular Surgery Risk Assessment in the "Real World": ArgenSCORE Adjusted by Center

Estimación del riesgo en cirugía cardíaca en el "mundo real": ArgenSCORE ajustado al centro

VICTORIO C. CAROSELLA[1], HUGO GRANCELLI[2], PABLO STUTZBACH[1], ALAN R. SIGAL[3], EZEQUIEL LERECH[3], LUDMILA MORCOS[3], CESAR VILLALBA[3], DIEGO LOWENSTEIN HABER[3], ALEJANDRO HITA[4], CARLOS NOJEK[5]

ABSTRACT

Background: The ArgenSCORE I was developed in 1999 on a population with 8% mortality. The ArgenSCORE II emerged after recalibrating the original model in 2007 on a validation population with 4% mortality. Using the CONAREC XVI registry, we evaluated the hypothesis that the ArgenSCORE II could better predict the risk of in-hospital mortality in centers with low mortality, whereas the ArgenSCORE I could better predict mortality in centers with high mortality.
Methods: A total of 2548 patients from 44 centers of the prospective and multicenter cardiac surgery CONAREC XVI registry, were analyzed. Mean observed mortality (OM) and mean expected mortality (EM) were estimated applying both versions of the ArgenSCORE.
The OM/EM ratio was calculated in each center for both models and the Z test was used to evaluate significant differences.
Results: In-hospital mortality was 7.69% for the entire registry. In 75% of the centers (33/44) mortality was >6%. In centers with mortality <6%, the OM/EM ratio was close to 1 after applying the ArgenSCORE II, without significant differences. In centers with mortality > 6%, the ArgenSCORE II significantly underestimated the risk. On the contrary, when the ArgenSCORE I was applied in these centers, the OM/EM ratio was close to 1, without significant differences.
Conclusions: The recalibrated ArgenSCORE II is recommended in centers with mortality < 6%, while in those with mortality > 6% the original ArgenSCORE I has better performance.

Key words: Cardiac Surgical Procedures - Mortality - Risk Assessment - Risk Adjustment

RESUMEN

Introducción: El ArgenSCORE tiene una versión original (I) desarrollada en 1999 sobre una población con mortalidad del 8% y una versión II (recalibración del modelo en 2007) sobre una población con una mortalidad del 4%. Evaluamos en el registro CONAREC XVI la hipótesis de que el ArgenSCORE II podría estimar mejor el riesgo de mortalidad intrahospitalaria en los centros con baja mortalidad; en cambio, el ArgenSCORE I estimaría mejor la mortalidad en los centros con alta mortalidad.
Material y métodos: Se analizaron 2548 pacientes de 44 centros del registro prospectivo y multicéntrico en cirugía cardíaca, CONAREC XVI. En cada centro se evaluó la mortalidad media observada (MO) y se calculó la mortalidad estimada media (ME) aplicando ambas versiones del ArgenSCORE.
Se calculó la relación OM/EM de cada centro para los dos modelos y se evaluó si había diferencias significativas mediante el test Z.
Resultados: La mortalidad intrahospitalaria del registro fue del 7,69%. El 75% de los centros (33/44) presentaban una mortalidad mayor del 6%. En centros con mortalidad menor del 6%, al aplicar el ArgenSCORE II, la relación OM/EM mostró valores cercanos a 1 y sin diferencias significativas. En centros con mortalidad mayor del 6%, el ArgenSCORE II subestima significativamente el riesgo. En cambio, cuando se aplica en estos centros el ArgenSCORE I, la relación OM/EM es cercana a 1 (sin diferencias significativas).
Conclusiones: En centros con mortalidad menor del 6%, es recomendable utilizar el ArgenSCORE II-recalibrado; en centros con mortalidad mayor del 6%, tiene mejor desempeño el ArgenSCORE I-original.

Palabras claves: Procedimientos quirúrgicos cardíacos - Mortalidad - Medición de riesgo - Ajuste de riesgo

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Address for reprints: Dr. Victorio C. Carosella. Servicio de Cardiología - Instituto Cardiovascular San Isidro, Sanatorio Las Lomas - Gorriti 21 - C.P.1642, San Isidro, Buenos Aires, Argentina - Tel: +54 11- 4708- 5000 - E-mail: drcarosella@hotmail.com

[1] Department of Cardiology, Instituto Cardiovascular San Isidro, Sanatorio Las Lomas, San Isidro, Pcia. de Buenos Aires, Argentina
[2] Department of Cardiology, Sanatorio de la Trinidad, Ciudad Autónoma de Aires, Argentina
[3] On behalf of Consejo Argentino de Residentes de Cardiología (CONAREC), Argentina
[4] Department of Cardiology, Hospital Universitario Austral, Escobar, Buenos Aires, Argentina
[5] Department of Cardiovascular Surgery, Sanatorio Finochietto, Ciudad Autónoma de Buenos Aires, Argentina
[6] Department of Cardiovascular Surgery, Sanatorio de los Arcos, Ciudad Autónoma de Buenos Aires, Argentina

Abbreviations

STS	Society of Thoracic Surgeons	**AMAV**	ArgenSCORE mean absolute value in each center
EuroSCORE	European System for Cardiac Operative Risk Evaluation	**OM**	Mean observed mortality in each center
ArgenSCORE	Argentine System for Cardiac Operative Risk Evaluation	**EM**	Mean estimated mortality in each center
CONAREC	Argentine Council of Cardiology Residents		

INTRODUCTION

Preoperative risk prediction models have been widely used over the past three decades to achieve a better indication of cardiovascular surgery and optimize results. (1-5) The Society of Thoracic Surgeons (STS) (4) and the European System for Cardiac Operative Risk Evaluation (EuroSCORE), I (1) and II, are the models most commonly used. (5)

Many studies have identified geographical and epidemiological differences in the risk profile, surgical strategy and decision-making process for an eventual surgery not only across countries, but also across centers within the same city. (2, 3, 6-14)

Therefore, preoperative risk prediction models usually lose their effectiveness when used in settings other than in the patient group in which the model was developed as it has already been demonstrated by many publications. (2, 3, 6-10) Many authors have suggested the need for developing local risk models specific for each geographical region. (2, 3, 7, 10-14) Each country should develop its own risk score. Particularly, these social and epidemiological differences might have clinical relevance when Latin American populations are compared with other populations where the risk scores commonly used were developed.

Based on these concepts, in 1999 we developed a local risk score of in-hospital mortality in cardiovascular surgery, the Argentine System for Cardiac Operative Risk Evaluation (ArgenSCORE) in a population with 8% mortality rate, that was recalibrated in 2007 in a different population with 4% mortality rate. (2, 3)

In turn, the Argentine Council of Cardiology Residents (CONAREC) conducted a prospective and multicenter registry, CONAREC XVI, including 2553 patients undergoing cardiovascular surgery in 49 centers in Argentina between September 2007 and October 2008. (15)

The heart team and the attending physician should know the actual results of cardiovascular surgery and interventional cardiology procedures in their centers to make the best therapeutic decisions in the real world and thus improve the risk-benefit equation for the patient. All the therapeutic advances, heart team definitions and use of clinical guidelines and consensus statements are aimed at proposing a certain strategy in centers with low mortality rate. That is why it is necessary to apply the criteria of a local score adapted to the reality of our country, demonstrating its predictive value and how it performs in centers with low mortality. The confirmed benefit of using the ArgenSCORE II in low mortality centers would be an important contribution for the management of this population of patients.

Considering on the one hand a local score (the ArgenSCORE) that has been validated and has demonstrated good statistical performance, better than other international models applied to local populations (2, 3, 16, 17), and on the other, a multicenter registry showing the reality of cardiovascular surgery in Argentina, we designed this study to explore two hypotheses.

The fist hypothesis is that, in centers with low mortality rate, the AgenSCORE II (the model recalibrated in 2007) would correctly estimate mortality and thus its use would imply a benefit in these cases (correct application of practice guidelines and consensus statements). But as the mean mortality rate in the CONAREC XVI registry was 7.6%, the second hypothesis was that the ArgenSCORE II would underestimate risk in centers with higher mortality rate; thus, the ArgenSCORE I (original score developed in 1999) and not the ArgenSCORE II should be used in these centers to improve the predictive power of the model (estimation of the expected risk).

METHODS

Population

Dara from the 49 centers of the CONAREC XVI registry were analyzed. Five centers recorded <10 patients and were excluded from the analysis; thus, 44 centers were included with data from 2548 patients. The centers were identified with a number to ensure confidentiality. In-hospital mortality was analyzed for the entire registry and the differences of mortality across centers was evaluated.

Application of the ArgenSCORE I and ArgenSCORE II according to center mortality

As usual, the score includes different risk factors and variables associated with the type of surgical procedure. The original version of this model was developed in 1999 on a referral population with 8.2% operative mortality (ArgenSCORE I), and a second version emerged after recalibrating the original model in 2007 on a validation population with an operative mortality of 3.96% (ArgenSCORE II). (2, 3)

We evaluated the hypothesis that the ArgenSCORE II could better predict in-hospital mortality in centers with low mortality, whereas the ArgenSCORE I would better predict mortality in centers with high mortality.

The ArgenSCORE is an additive model where the estimated risk corresponds to the sum of the absolute values assigned to each positive variable detected in the patients. Figure 1 shows a hypothetical example of a patient with an absolute additive value of 30 points. This value would correspond to a risk of mortality of 10.91% for the ArgenSCORE I and 4.34% for the ArgenSCORE II. (**Supplementary material**)

Therefore, after evaluating in-hospital mortality in each center, which we called "mean observed mortality " (OM), the ArgenSCORE mean absolute value (AMAV) was calculated for each institution. The first step is to calculate the absolute value of the ArgenSCORE in each patient and then calculate the mean value in each center. In this way, the mean estimated mortality (EM) of the ArgenSCORE II and I can be calculated using the AMAV. For example, for a center with AMAV of 30 points, the EM of the ArgenSCORE II is 4.34% and 10.91% for the ArgenSCORE I (**Supplementary material**)

Statistical analysis

The clinical outcome was in-hospital mortality, defined as death before discharge from hospital. (12-14, 18) The aim of this analysis was not to validate the model, which had already been validated (2, 3, 16, 17), but, given the difference in mortality rates between centers, it was to develop a tool that would improve the clinical application of the ArgenSCORE according to the reality of each center, analyzing the observed-to-expected (OM/EM) mortality ratio, based on the existing literature. (19-28) For this purpose, the OM/EM ratio for the ArgenSCORE II and ArgenSORE II was calculated in each center and the Z test was used to evaluate the presence of significant differences. The OM/EM ratio has multiple applications in the scientific literature, and it is often used to determine model performance or quality of care and performance of centers. This widely used ratio (19-24) is also known as hazard ratio. (25, 26) and when it is multiplied by 100 it is called standardized mortality ratio (SMR). (19, 20, 27, 28) Data analyses were performed using SPSS 21.0 statistical software package (SPSS Inc., Chicago, IL).

Ethical considerations

The study protocol and the informed consent form were sent for approval to the Ethics Committee of each institution. The study protocol and the definitions used have been published elsewhere. (11) Personal data were not obtained to preserve patients' identity. Patients were clearly informed that their identity and all their personal data would remain anonymous, and about the mechanisms used to protect their identity to ensure the confidentiality of the data provided. The study was conducted following the recommendations of the Helsinki Declaration of 1975, corrected in 1983 and revised in 1989.

RESULTS

In-hospital mortality was 7.69% for the entire registry. Mortality across the different centers was heterogeneous, ranging between 1.3% and 17%. Of the 44 centers analyzed, 28 (63.6%) presented mortality rate >7%, and those centers with mortality rate >6% represented 75% of the registry (33 centers).

As shown in Table 1, when the recalibrated ArgenSCORE II, currently used in daily practice, was applied, the OM/EM ratio was close to 1 in those centers with mortality rate <6%, without significant differences in the Z test. Risk estimation is more accurate as the value of this ratio is closer to 1. When this ratio is >1, risk is underestimated, resulting in worse observed outcomes than those predicted by the score. On the contrary, when the value is <1, risk is overestimated and the results observed are better than those estimated by the score evaluated.

Conversely, in centers with mortality rate >6%, the ArgenSCORE II significantly underestimates the risk, with an OM/EM ratio >1, between 2.22 and 4.17 and, obviously, with significant differences evidenced by the Z test (Table 2).

The hypothesis of the study is supported by the fact that when the ArgenSCORE I is applied to these centers with higher mortality, risk is better estimated, as demonstrated by a OM/EM ratio close to 1, with no significant differences using the Z test. Thus, in centers with higher mortality, the ArgenSCORE I rather than the ArgenSCORE II should be used (applied).

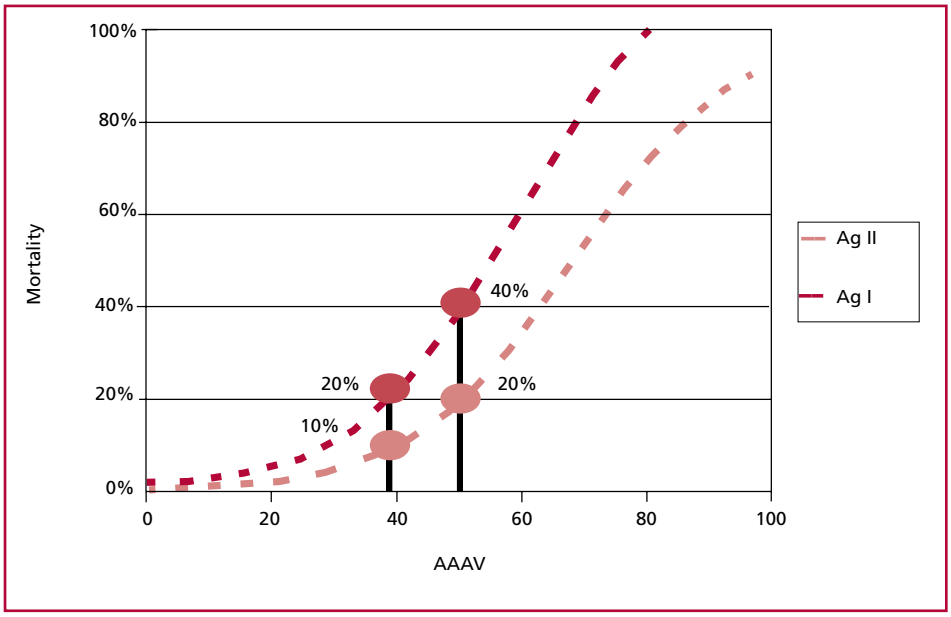

Fig. 1. Relationship between absolute additive value of the ArgenSCORE and estimated mortality. After recalibrating the model, for a similar absolute additive value, the ArgenSCORE I estimates a higher risk and the ArgenSCORE II estimates a lower risk. Ag I = ArgenSCORE I; Ag II = ArgenSCORE II. AAAV = ArgenSCORE absolute additive value.

DISCUSSION

As different therapeutic options have been developed over the past few years to treat cardiovascular diseases, the proper assessment of the operative risk of cardiovascular surgery has become clinically significant. Therefore, operative risk models have gained a leading role, since they constitute a useful and objective tool for risk stratification and contribute to a better treatment selection.

The CONAREC XVI registry provided an insight of the reality of cardiovascular surgery in Argentina, with centers with very different mortality rates, ranging from those with similar results to international series to others with very high mortality.

We were able to define that the ArgenSCORE II is more suitable for predicting the risk of mortality in centers with mean mortality rate <6% (correct application of practice guidelines and consensus statements). But in centers with mortality >6%, the ArgenSCORE II should not be applied as it underestimates risk, and should be replaced by the AgenSCORE I.

Moreover, we managed to adapt (adjust) this score to the reality of our country, as it was developed in our own (local) populations, and has proved to perform better than other international scores validated in Argentine populations. (2, 3, 16, 17) These changes improve risk prediction and contribute to make the best decisions for our patients (a local score applied and adjusted to populations and centers in Argentina).

Each patient represents a different scenario with a different strategy to define considering patient-related factors (biological state, cardiac and extra-cardiac conditions, etc.) and center-related factors (resources, infrastructure, experience and previous results). (29-31) The combination of all these variables affects operative mortality. The weight of center-related variables is such that the models need to be adjusted to the reality of each institution ("real world"). (2, 3, 6-14)

The heart team and the attending physician should know the actual results of cardiovascular surgery and interventional cardiology procedures in their centers, and our professional decisions should be based on our realities. It is well known that the results of randomized clinical trials are often different from those observed in registries. In Argentina, although there are centers with considerable experience and volume of patients whose mortality rates are similar to those of international reference centers, there are other groups with higher mortality rates. The first step to define the approach based on guidelines and consensus statements is to comply with the premise of obtaining an expected result. As we could notice in this study, this premise clearly applies to low mortality centers, where the ArgenSCORE II is an appropriate tool to predict operative risk, but it does not apply to centers with high mortality, where the ArgenSCORE I performs better.

Therefore, based on these observations, two different scenarios emerge to stratify patient's risk according to clinical risk factors, and define it on the basis of the risk cut-off points indicated in the literature, guidelines and consensus statements (Table 3) (32, 33), depending on the mortality rate in the center where the patient is being evaluated (different due to center-related factors).

In centers with mortality rate <6%, where the ArgenSCORE II must be used, the score absolute additive value in a high-risk patient (>8%) is >37 points (this score is the sum of the patient's risk factors). In centers with mortality rate >6%, where the Argen-

Center (Nº)	4	29	23	32	11
OM (%)	1.30	1.80	2.60	3.40	5.7
ArgenSCORE II (EM) (%)	3.74	3.61	4.12	5.04	4.31
OM/EM ratio	0.35	0.50	0.63	0.67	1.32
Z test (*P* vaue)	0.40	0.185	0.609	0.846	0.149
ArgenSCORE I (EM) (%)	9.66	9.38	10.45	12.3	10.83
OM/EM ratio	0.13	0.19	0.24	0.27	0.52
Z test (*P* vaue)	0.006	<0.0001	0.003	0.037	<0.0001

OM: Mean observed mortality in each center. EM: Mean estimated mortality in each center

Table 1. Centers with mean observed mortality <6% Best mortality estimated with the ArgenSCORE II)

Center (Nº)	33	9	36	39	13	39	13
OM (%)	7.5	9.0	10.8	10.8	10.9	13.6	17
ArgenSCORE II (EM) (%)	1.93	3.05	2.94	4.87	4.95	5.0	2.55
OM/EM ratio	3.89	2.95	2.59	2.22	2.34	2.72	6.66
Z test (*P* vaue)	0.004	0.0006	0.0004	0.022	0.009	0.017	0.007
ArgenSCORE I (EM) (%)	5.58	8.17	7.15	11.96	12.13	12.11	7.04
OM/EM ratio	1.34	1.1	1.51	0.90	0.9	1.11	2.41
Z test (*P* vaue)	0.49	0.776	0.296	0.995	0.899	0.868	0.058

OM: Mean observed mortality in each center. EM: Mean estimated mortality in each center

Table 2. Centers with mean observed mortality > 6% Best mortality estimated with the ArgenSCORE I

Estimated risk	Sum of patient's absolute values	
	ArgenSCORE II (Centers with mortality <6%)	ArgenSCORE I (Centers with mortality >6%)
Low risk (<4%)	≤29	≤16.5
Moderate risk (>4 a <8%)	>29 ≤37	>16.5 ≤25.8
High risk (>8%)	>37	>25.8

Table 3. Cut-off points by center: real world [2014 AHA/ACC guideline for the management of patients with valvular heart disease (32) and 2015 Argentine Society of Cardiology Valvular Heart Disease Consensus Statement (33)]

SCORE I must be used, the score absolute additive value in the same patient is >25.8 points. (**Supplementary material**) In other words, for the same clinical risk, the predicted mortality changes according to the center where the procedure will be performed (depending on which version of ArgenSCORE the center should use).

Conversely, in centers with mortality <6%, the score absolute additive value in an intermediate risk patient (4-8%) is >29, while in centers with mortality >6%, this value is only >16.5. Finally, in a low-risk patient (<4) the score absolute additive value is ≤29 in centers with mortality rates <6%, whereas in centers with mortality >6%, where the ArgenSCORE I must be used, it is only ≤16.5.

Interestingly, the different variables that constitute the ArgenSCORE, which are expressed as a sum of additive values to calculate an estimated risk, have different weights in centers with lower mortality than in those with higher mortality (different estimated risks).

The literature offers different methods for risk adjustment. The OM/EM ratio based on the STS score (20) is most frequently used in the United States and is the one we have used to evaluate the hypothesis in our investigation. This ratio is widely used; when it is multiplied by 100 it is called standardized mortality ratio (SMR) or hospital standardized mortality, or OM/EM ratio or hazard ratio. (19-27) Risk-adjusted mortality is another method used, which is defined as the ratio of the center's EM divided by the EM of all the centers multiplied by the crude death rate (unadjusted mortality of the city). (20, 27, 28)

Another clinical message left by this article is that for an adequate risk stratification of our patients as close as possible to the real world it is necessary to follow the steps described in the algorithm shown in Table 4. Nevertheless, recalibration of the prediction model to the reality of the center is the most reliable and specific way to adjust the performance of a risk model to the different realities of the validation centers. (34-36)

This study has several limitations. Firstly, this analysis was performed on a dataset collected between 2007 and 2008, and we know that surgery is a dynamic process that evolves over the years. Secondly, the CONAREC XVI registry has no records of heart transplantation, aortic dissection and insulin dependence, variables used by the ArgenSCORE, which could perhaps diminish the performance of the local score.

Table 4. Algorithm to be used for risk estimation according to the reality of the center (our "real world")

1. Start prospective incorporation of all your surgical data into a database.
2. Calculate mean OM of your center.
3. Calculate mean EM of your center in a prospective fashion. Use the model or models you trust most (we recommend SAC valvular heart disease consensus statement; use all three models: ArgenSCORE, STS and EuroSCORE II) (33).
   The AMAV allows to define the mean EM of the center in a very simple way: once you have identified its value, search in the **Supplementary material** which EM corresponds to the AMAV of your center.
4. Evaluate the OM/EM ratio (HR or SMR) of your center.
5. Identify the risk score with the value closest to 1. Use the Z test to calculate significant differences in the OM/EM ratio.
6. Use the risk score with non-significant differences.
7. If all the scores produce significant differences, identify the one closest to 1 and apply the following formula, described by Jin and et al. (21) and others (20,22):
   EM by ArgenSCORE/CF = EM by recalibrated ArgenSCORE
   For example:
   Your center has OM/EM ratio 8% / 4% = 2
   Your patient has an EM by ArgenSCORE: 3.5%.
   Formula: EM by ArgenSCORE/CF = EM by recalibrated ArgenSCORE
   CF (calibration factor): OM/EM ratio: 4% / 8% = 0.5
   3.5 / 0.5 = 7%.

Your patient's estimated risk by recalibrated ArgenSCORE is 7%. Obviously, it is better to recalibrate the score in the entire database of the center and thus obtain a score recalibrated or adjusted to the reality of the center.

Thirdly, we analyzed cardiovascular surgeries globally where mortality is not uniform, which may justify, in part, the dispersion of data observed among the centers. (37, 38) Finally, this study is only observational, and a prospective analysis should be performed to validate these findings.

In conclusion, the analysis of the population of the CONAREC XVI registry allowed us to understand, in part, the heterogeneous reality of cardiovascular surgery centers in our country. The ArgenSCORE is a local and additive model that allows the estimation of the center's mortality in a simple fashion after calculating the AMAV. The OM/EM ratio of the ArgenSCORE I and the ArgenSCORE II allowed the evaluation of the most suitable score to be used in the different centers, according to their mortality ("real world"). This can contribute to manage our patients with the most appropriate indication of procedures, but also to improve the results of the centers, as understanding our realities can ameliorate the future surgical outcomes. (32, 33).

Conflicts of interest
None declared.

(See authors' conflicts of interest forms on the website/ Supplementary material)

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SUPPLEMENTARY MATERIAL

After recalibrating the model, for each absolute value of the model, the ArgenSCORE I estimates a higher risk and the ArgenSCORE II estimates a lower risk.

ArgenSCORE (Asolute value)	ArgenSCORE II (Year 2007)	ArgenSCORE I (Year 1999)
0.0	0.29%	1.10%
0.5	0.30%	1.14%
1.0	0.31%	1.19%
1.5	0.33%	1.24%
2.0	0.34%	1.29%
2.5	0.36%	1.34%
3.0	0.38%	1.39%
3.5	0.40%	1.45%
4.0	0.41%	1.51%
4.5	0.43%	1.57%
5.0	0.45%	1.63%
5.5	0.47%	1.70%
6.0	0.50%	1.76%
6.5	0.52%	1.83%
7.0	0.54%	1.91%
7.5	0.57%	1.98%
8.0	0.60%	2.06%
8.5	0.62%	2.15%
9.0	0.65%	2.23%
9.5	0.68%	2.32%
10.0	0.72%	2.41%
10.5	0.75%	2.51%
11.0	0.78%	2.61%
11.5	0.82%	2.71%
12.0	0.86%	2.82%
12.5	0.90%	2.93%
13.0	0.94%	3.05%
13.5	0.99%	3.17%
14.0	1.03%	3.29%
14.5	1.08%	3.42%
15.0	1.13%	3.56%
15.5	1.18%	3.70%
16.0	1.24%	3.84%
16.5	1.29%	3.99%
17.0	1.35%	4.15%
17.5	1.42%	4.31%
18.0	1.48%	4.48%
18.5	1.55%	4.65%
19.0	1.62%	4.83%
19.5	1.70%	5.02%
20.0	1.78%	5.22%
20.5	1.86%	5.42%
21.0	1.95%	5.63%
21.5	2.04%	5.84%
22.0	2.13%	6.07%
22.5	2.23%	6.30%
23.0	2.33%	6.54%
23.5	2.44%	6.79%
24.0	2.55%	7.04%

ArgenSCORE (Asolute value)	ArgenSCORE II (Year 2007)	ArgenSCORE I (Year 1999)
24.5	2.66%	7.31%
25.0	2.79%	7.59%
25.5	2.91%	7.87%
26.0	3.05%	8.17%
26.5	3.19%	8.47%
27.0	3.33%	8.79%
27.5	3.48%	9.11%
28.0	3.64%	9.45%
28.5	3.81%	9.80%
29.0	3.98%	10.16%
29.5	4.16%	10.53%
30.0	4.34%	10.91%
30.5	4.54%	11.30%
31.0	4.74%	11.71%
31.5	4.95%	12.13%
32.0	5.18%	12.56%
32.5	5.41%	13.01%
33.0	5.65%	13.47%
33.5	5.90%	13.94%
34.0	6.16%	14.43%
34.5	6.43%	14.93%
35.0	6.71%	15.45%
35.5	7.00%	15.98%
36.0	7.31%	16.52%
36.5	7.63%	17.08%
37.0	7.96%	17.65%
37.5	8.30%	18.24%
38.0	8.66%	18.85%
38.5	9.03%	19.47%
39.0	9.41%	20.10%
39.5	9.81%	20.75%
40.0	10.23%	21.42%
40.5	10.66%	22.10%
41.0	11.11%	22.79%
41.5	11.57%	23.51%
42.0	12.05%	24.23%
42.5	12.54%	24.97%
43.0	13.06%	25.73%
43.5	13.59%	26.50%
44.0	14.14%	27.29%
44.5	14.70%	28.09%
45.0	15.29%	28.91%
45.5	15.90%	29.73%
46.0	16.52%	30.58%
46.5	17.16%	31.43%
47.0	17.83%	32.30%
47.5	18.51%	33.18%
48.0	19.22%	34.07%
48.5	19.94%	34.98%

ArgenSCORE (Asolute value)	ArgenSCORE II (Year 2007)	ArgenSCORE I (Year 1999)
49.0	20.69%	35.89%
49.5	21.45%	36.82%
50.0	22.24%	37.75%
50.5	23.04%	38.70%
51.0	23.87%	39.65%
51.5	24.71%	40.61%
52.0	25.58%	41.58%
52.5	26.46%	42.56%
53.0	27.37%	43.54%
53.5	28.29%	44.52%
54.0	29.23%	45.51%
54.5	30.20%	46.51%
55.0	31.17%	47.50%
55.5	32.17%	48.50%
56.0	33.18%	49.50%
56.5	34.21%	50.50%
57.0	35.25%	51.50%
57.5	36.31%	52.50%
58.0	37.38%	53.49%
58.5	38.46%	54.49%
59.0	39.56%	55.48%
59.5	40.66%	56.46%
60.0	41.78%	57.44%
60.5	42.90%	58.42%
61.0	44.03%	59.39%
61.5	45.17%	60.35%
62.0	46.31%	61.30%
62.5	47.45%	62.25%
63.0	48.60%	63.18%
63.5	49.75%	64.11%
64.0	50.90%	65.02%
64.5	52.05%	65.93%
65.0	53.20%	66.82%
65.5	54.34%	67.70%
66.0	55.48%	68.57%
66.5	56.61%	69.42%
67.0	57.74%	70.27%
67.5	58.86%	71.09%
68.0	59.96%	71.91%
68.5	61.06%	72.71%
69.0	62.15%	73.50%
69.5	63.23%	74.27%
70.0	64.29%	75.03%
70.5	65.34%	75.77%
71.0	66.37%	76.49%
71.5	67.39%	77.21%
72.0	68.40%	77.90%
72.5	69.38%	78.58%
73.0	70.35%	79.25%
73.5	71.30%	79.90%
74.0	72.23%	80.53%
74.5	73.15%	81.15%
75.0	74.04%	81.76%
75.5	74.91%	82.35%

ArgenSCORE (Asolute value)	ArgenSCORE II (Year 2007)	ArgenSCORE I (Year 1999)
76.0	75.77%	82.92%
76.5	76.60%	83.48%
77.0	77.42%	84.02%
77.5	78.21%	84.55%
78.0	78.98%	85.07%
78.5	79.74%	85.57%
79.0	80.47%	86.06%
79.5	81.18%	86.53%
80.0	81.88%	86.99%
80.5	82.55%	87.44%
81.0	83.20%	87.87%
81.5	83.83%	88.29%
82.0	84.45%	88.70%
82.5	85.04%	89.09%
83.0	85.62%	89.47%
83.5	86.18%	89.84%
84.0	86.72%	90.20%
84.5	87.24%	90.55%
85.0	87.74%	90.89%
85.5	88.23%	91.21%
86.0	88.70%	91.53%
86.5	89.15%	91.83%
87.0	89.59%	92.13%
87.5	90.01%	92.41%
88.0	90.41%	92.69%
88.5	90.80%	92.96%
89.0	91.18%	93.21%
89.5	91.54%	93.46%
90.0	91.89%	93.70%
90.5	92.23%	93.93%
91.0	92.55%	94.16%
91.5	92.86%	94.37%
92.0	93.16%	94.58%
92.5	93.45%	94.78%
93.0	93.73%	94.98%
93.5	93.99%	95.17%
94.0	94.25%	95.35%
94.5	94.49%	95.52%
95.0	94.73%	95.69%
95.5	94.95%	95.85%
96.0	95.17%	96.01%
96.5	95.37%	96.16%
97.0	95.57%	96.30%
97.5	95.76%	96.44%
98.0	95.95%	96.58%
98.5	96.12%	96.71%
99.0	96.29%	96.83%
99.5	96.45%	96.95%
100.0	96.60%	97.07%
100.5	96.75%	97.18%
101.0	96.89%	97.29%
101.5	97.03%	97.39%
102.0	97.16%	97.49%
102.5	97.28%	97.59%

ArgenSCORE (Asolute value)	ArgenSCORE II (Year 2007)	ArgenSCORE I (Year 1999)
103.0	97.40%	97.68%
103.5	97.52%	97.77%
104.0	97.62%	97.85%
104.5	97.73%	97.94%
105.0	97.83%	98.02%
105.5	97.92%	98.09%
106.0	98.02%	98.17%
106.5	98.10%	98.24%
107.0	98.19%	98.30%
107.5	98.27%	98.37%
108.0	98.34%	98.43%
108.5	98.42%	98.49%
109.0	98.49%	98.55%
109.5	98.55%	98.61%
110.0	98.62%	98.66%
110.5	98.68%	98.71%
111.0	98.74%	98.76%
111.5	98.79%	98.81%

ArgenSCORE (Asolute value)	ArgenSCORE II (Year 2007)	ArgenSCORE I (Year 1999)
112.0	98.85%	98.86%
112.5	98.90%	98.90%
113.0	98.95%	98.94%
114.8	99.11%	99.08%
114.0	99.04%	99.02%
114.5	99.08%	99.06%
115.0	99.12%	99.10%
115.5	99.16%	99.13%
116.0	99.20%	99.17%
116.5	99.24%	99.20%
117.0	99.27%	99.23%
117.5	99.30%	99.26%
118.0	99.33%	99.29%
118.5	99.36%	99.32%
119.0	99.39%	99.34%
119.5	99.42%	99.37%
120.0	99.44%	99.39%
120.5	99.47%	99.42%