

First-Ever Stroke and Transient Ischemic Attack Incidence and 30-Day Case-Fatality Rates in a Population-Based Study in Argentina

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Background and Purpose—Epidemiological data about stroke are scarce in low- and middle-income Latin-American countries. We investigated annual incidence of first-ever stroke and transient ischemic attack (TIA) and 30-day case-fatality rates in a population-based setting in Tandil, Argentina.

Methods—We prospectively identified all first-ever stroke and TIA cases from overlapping sources between January 5, 2013, and April 30, 2015, in Tandil, Argentina. We calculated crude and standardized incidence rates. We estimated 30-day case-fatality rates.

Results—We identified 334 first-ever strokes and 108 TIAs. Age-standardized incidence rate per 100 000 for Segi's World population was 76.5 (95% confidence interval [CI], 67.8–85.9) for first-ever stroke and 25.1 (95% CI, 20.2–30.7) for first-ever TIA, 56.1 (95% CI, 48.8–64.2) for ischemic stroke, 13.5 (95% CI, 9.9–17.9) for intracerebral hemorrhage, and 4.9 (95% CI, 2.7–8.1) for subarachnoid hemorrhage. Stroke incidence was slightly higher for men (87.8; 95% CI, 74.6–102.6) than for women (73.2; 95% CI, 61.7–86.1) when standardized for the Argentinean population. Thirty-day case-fatality rate was 14.7% (95% CI, 10.8–19.5) for ischemic stroke, 24.1% (95% CI, 14.2–36.6) for intracerebral hemorrhage, and 1.9% (95% CI, 0.4–5.8) for TIA.

Conclusions—This study provides the first prospective population-based stroke and TIA incidence and case-fatality estimate in Argentina. First-ever stroke incidence was lower than that reported in previous Latin-American studies, but first-ever TIA incidence was higher. Thirty-day case-fatality rates were similar to those of other population-based Latin-American studies. (*Stroke*. 2016;47:00-00. DOI: 10.1161/STROKEAHA.116.013637.)

Key Words: death ■ incidence ■ population ■ stroke

Latin-American countries have low- and middle-income economies and strive to reduce the burden of noncommunicable diseases. A major limitation of these countries is

the scarcity of data necessary to develop appropriate health policies. According to United Nations, Latin-American countries need to improve data collection systems required for

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developing health policies.¹ Despite this, stroke incidence studies in Latin America have only been performed in Chile,² Brazil,^{3,4} Mexico,⁵ and Uruguay.⁶ Although data are available from a former National Stroke Registry, stroke incidence remains unknown in Argentina, as in many other Latin-American countries.⁷

PrEViSTA, the Program for the Epidemiological Evaluation of Stroke In Tandil, Argentina, is a prospective population-based study of first-ever stroke and transient ischemic attack (TIA) incidence; distribution of risk factors; and 30-day, 6-month, and 12-month case-fatality rates and recurrence.⁸ In this analysis, we report first-ever stroke and TIA incidence and 30-day case-fatality rates.

Methods

Using several overlapping strategies, we enrolled all first-ever ischemic strokes (IS), intracerebral hemorrhages (ICH), subarachnoid hemorrhages, strokes of undetermined cause, and TIAs in Tandil, between January 5, 2013, and April 30, 2015 (Figure I in the online-only Data Supplement). We standardized first-ever stroke (IS+ICH+subarachnoid hemorrhage+stroke of undetermined cause) and TIA incidence rates to Argentinean, Segi's European, European 2013, Segi's World, and WHO World populations by the direct method. We calculated case-fatality rates and performed Kaplan–Meier analyses to estimate survival curves. We used the log-rank test (Mantel–Cox) to compare survival between groups: first-ever versus recurrent stroke, stroke types, males versus females, and age quintiles (<58, 59–68, 69–76, 77–84, and >84 years). A full description of the methods is offered elsewhere⁸ and in the online-only Data Supplement.

Results

We identified 334 first-ever strokes and 108 TIAs. Crude annual first-ever stroke incidence per 100 000 was 127.9, whereas it was 105.5, 114.7, 184.7, 88.1, and 76.5 when standardized to Argentinean, Segi's European, European 2013, WHO World, and Segi's World populations, respectively (Table). Age-specific annual incidence rates of overall first-ever strokes and stroke types stratified by sex are displayed in Table I in the online-only Data Supplement. Annual crude first-ever stroke incidence was similar in men (125.9) and women (129.8) and increased with age (Figure II in the online-only Data Supplement). When standardized to the Argentinean population, it was slightly higher for men (87.8) than for women (73.2).

First-ever crude TIA annual incidence rates was 41.4. It was 34.4 and 37.6, when standardized for Argentinean and Segi's European populations, respectively (Table). For first-ever stroke and TIA considered together, crude incidence rate was 169.2 (152.3 after standardization for Segi's European population).

Thirty-day case-fatality rate was 15.6% for all cerebrovascular events, 14.7% for IS, 24.1% for ICH, 47.1% for subarachnoid hemorrhage, 75.0% for strokes of undetermined pathogenesis, and 1.9% for TIA (Table II in the online-only Data Supplement). The main cause of death was neurological (53.4%), followed by pneumonia (23.3%). Causes of death in 2 patients with TIA were recurrent fatal stroke and myocardial

Table. Incidence Rates per 100 000 Population of First-Ever Stroke, by Age and Sex

Age Groups (Number-at-Risk)	All First-Ever Strokes		Ischemic Stroke		Intracerebral Hemorrhage		Subarachnoid Hemorrhage		Transient Ischemic Attack	
	n	Incidence Rate	n	Incidence Rate	n	Incidence Rate	n	Incidence Rate	n	Incidence Rate
0–24 (99 943)	3	3.0 (0.6–8.8)	0	0.0 (0.0–7.5)	1	1.0 (0.0–5.6)	2	2.0 (0.2–7.2)	1	1.0 (0.0–5.6)
25–34 (39 789)	2	5.0 (0.6–18.2)	0	0.0 (0.0–18.4)	1	2.5 (0.1–14.0)	1	2.5 (0.1–14.0)	0	0.0 (0.0–9.3)
35–44 (33 515)	15	44.8 (25.0–73.8)	13	38.8 (20.7–75.9)	2	6.0 (0.7–21.6)	0	0.0 (0.0–11.0)	3	9.0 (1.8–26.2)
45–54 (28 922)	28	96.8 (64.3–139.9)	19	65.7 (39.6–88.1)	6	20.7 (7.6–45.2)	2	6.9 (0.8–25.0)	9	31.1 (14.2–59.1)
55–64 (25 119)	52	207.0 (154.6–271.5)	39	155.3 (110.4–174.9)	9	35.8 (16.4–68.0)	4	15.9 (4.3–40.8)	19	75.6 (45.5–118.1)
65–74 (18 635)	82	440.0 (350.0–546.2)	61	327.3 (250.4–373.6)	16	85.9 (49.1–139.4)	4	21.5 (5.8–55.0)	30	161.0 (108.6–229.8)
75–84 (11 316)	85	751.1 (600.0–928.8)	66	583.2 (451.1–737.1)	14	123.7 (67.6–207.6)	1	8.8 (0.2–49.2)	36	318.1 (222.8–440.4)
85+ (3943)	67	1699.3 (1316.9–2158.0)	53	1344.2 (1006.9–1970.6)	5	126.8 (41.2–295.9)	3	76.1 (15.7– 222.4)	10	253.6 (121.6–466.4)
All, crude (261 182)	334	127.9 (114.5–142.4)	251	96.1 (84.6–116.9)	54	20.7 (15.5–27.0)	17	6.5 (3.8–10.4)	108	41.4 (33.9–49.9)
Standardized, Argentina	...	105.6 (94.6–117.6)	...	78.9 (69.4–89.3)	...	17.5 (13.1–22.8)	...	5.7 (3.3–9.2)	...	34.4 (28.2–41.5)
Standardized, Segi's Europe	...	114.7 (102.4–128.1)	...	85.6 (75.0–97.1)	...	19.4 (14.4–25.4)	...	6.3 (3.6–10.2)	...	37.6 (30.7–45.6)
Standardized, Europe 2013	...	184.7 (165.3–205.7)	...	139.9 (123.1–158.4)	...	29.0 (21.8–38.0)	...	8.6 (4.9–13.8)	...	59.3 (48.6–71.6)
Standardized, WHO World	...	88.1 (78.5–98.5)	...	65.2 (57.1–74.2)	...	15.2 (11.3–20.0)	...	5.2 (2.9–8.4)	...	29.1 (23.7–35.4)
Standardized, Segi's World	...	76.5 (67.8–85.9)	...	56.1 (48.8–64.2)	...	13.5 (9.9–17.9)	...	4.9 (2.7–8.1)	...	25.1 (20.2–30.7)

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infarction. Survival rates were higher for first-ever than for recurrent strokes, lower for the highest 2 age quintiles, and significantly differed across stroke types (Figure III in the online-only Data Supplement). There were no differences between men and women.

Discussion

In this prospective study of first-ever stroke and TIA incidence and 30-day case-fatality rate conducted in Tandil, Argentina, first-ever stroke annual incidence rate was lower, but TIA rate was higher than that reported in previous studies conducted in other Latin-American countries.²⁻⁶ Overall case-fatality rates were similar.

Differences in first-ever stroke incidence may be explained by distinctive population characteristics (eg, education, income, or lower risk factor prevalence, either because of differences between countries or temporal changes in prevalence)²⁻⁶ and possibly by improvements in the control of vascular risk factors in Argentina during the past 12 years (Figures IV and V in the online-only Data Supplement).

Crude annual first-ever stroke incident rates were similar among women and men, but higher for men than for women for the age group of 65 to 74 years. Among those aged ≥ 85 years, women showed higher rates than men, presumably because of adverse selection among the latter.

Standardized first-ever IS annual incidence rate was 56.1 (Segi's World population), lower than that in Chile (66.5)² and Brazil (86.0).³ Likewise, first-ever ICH incidence in Tandil (13.5) was lower than that in Chile (22.1)² and similar to Brazil (12.9).³

First-ever TIA standardized annual incidence rates were higher in Argentina than in Brazil (37.6 versus 14.0, Segi's European population).⁹ The proportion of TIAs with regard to all cerebrovascular events in Argentina (24.4% of the patients with first-ever events) was the highest reported in Latin America (Chile 6.8%² and Brazil 10.6%³), meaning that case ascertainment was highly efficient.

Overall first-ever stroke case-fatality rate at 30 days was similar to that reported in most Latin-American population-based studies.²⁻⁴ Case-fatality rates for IS and ICH were also comparable to other Latin-American studies, except for the highest rate seen in Matao, Brazil.^{2,5} Tandil lacks a formal stroke program and 24x7 on-call neurology service, intravenous thrombolysis is only seldom offered, and mechanical thrombectomy is not done. This is the general picture for most healthcare centers in the country.¹⁰

This study, conducted according to rigorous methodological standards, provides the first prospective population-based first-ever stroke and TIA incidence and case-fatality estimate in Argentina. Although the relatively low stroke rates are encouraging, the high case-fatality rates should be regarded as red flag showing the need for urgent acute stroke treatment policies.

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Disclosures

None.

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Supplemental Online File

This file includes:

(1) Full description of Methods

(2) Tables

Table I. Age- and sex-specific incidence rates per 100000 of first-ever stroke for all strokes and by pathological type

Table II. Case fatality rate and cause of death by first-ever stroke type and TIA

(3) Figures

Figure I. Description of study cohort

Figure II. First-ever crude annual incident of stroke in men and women

Figure III. Kaplan Meier analysis of 30-day mortality by first-ever vs. recurrent events, stroke type, sex, and age

Figure IV. Compared annual first-ever stroke incidence rates among Latin American Countries

Figure V. Trends in the Prevalence of Risk Factors in the Argentinean Population 2005-2013

Figure VI. Trends in Monitoring of Risk Factors in the Argentinean Population 2005-2013

(4) Appendices

Appendix I. Stroke Awareness Campaign

Appendix II. Stroke Awareness Flyers

Appendix III. Selected Media Appearances in National and Local Newspapers

(5) References

METHODS

PREVISTA was developed according to Sudlow and Warlow criteria for studies of stroke incidence¹ and by using the World Health Organization's Standardized Tools for Stroke Surveillance (WHO-STEPS) manual². We report this paper according to the recently published Standards of Reporting of Neurological Disorders (STROND).³ The full study protocol has been described in detail elsewhere.⁴

Tandil City

Tandil is located in the southeast of Buenos Aires province, Argentina, more than 100 km from the nearest city with health care facilities for treating stroke patients. Thus, it is unlikely for stroke patients to seek medical attention elsewhere. According to the National Census, the population of Tandil in 2010 was 123,871.⁵ There is one public hospital with 101 beds, 2 private hospitals with 134 beds, and 10 outpatient clinics.

Patients and Case Ascertainment Strategy

We enrolled all first-ever stroke and TIA cases in Tandil using several overlapping strategies, between May 1st, 2013 and April 30th, 2015. This report focuses on first-ever cerebrovascular events which were categorized as: (1) ischemic stroke (IS), (2) intracerebral hemorrhage (ICH), (3) subarachnoid hemorrhage (SAH), (4) stroke of undetermined cause, and (5) TIA. Two certified neurologists adjudicated all suspected events.

Investigators at each of the three Tandilean hospitals enrolled stroke and transient ischaemic attack patients. To ensure identification and inclusion of all cerebrovascular events during the recruitment period of two years, an "intensive stroke and transient ischaemic attack screening program" (hot pursuit) was instrumented to ensure inclusion of all cases during the recruitment period of two years. Two physicians were in charge of screening new admissions to the emergency department, general ward, coronary care unit, intensive care unit, and catheterization laboratory at each of the 3 Tandilean hospitals. For this purpose they contacted physicians and nurses in charge of the admitted patients and also reviewed the administrative documentation at each unit (e.g. lists of admissions). In addition, physicians from ambulatory care centers participated in the study. All general practitioners, family physicians, cardiologists, and neurologists were encouraged to refer any patient with symptoms

potentially associated with stroke or transient ischaemic attack to the enrolling team. They were contacted before launching the study (e.g. meetings and telephone calls) and during the recruitment period to enhance awareness about the study. Designated physicians and technicians at neuroimaging facilities reported all new cases of acute stroke and patients referred with a diagnosis of transient ischaemic attack, stroke, or any potential cerebrovascular symptom (e.g. headache, weakness, visual disturbances, speech problems) to the study coordinator. Three designated cardiologists reported patients scheduled for echocardiography or carotid Doppler ultrasound that were referred with a diagnosis of stroke or transient ischaemic attack.

There was also a “cold pursuit”. A designated nurse performed a retrospective review of all discharges from the 3 hospitals on a monthly basis during the study period. We also performed verbal autopsies of all individuals deceased during the study period. We identified 609 deaths occurred in Tandil during the study period that were not related to any of the cases detected during admission or in the ambulatory setting. Of them, 429 (70.4%) underwent verbal autopsies.⁶ We identified 6 fatalities that were deemed to be secondary to first-ever strokes.

In order to stimulate individuals with signs or symptoms suggestive of stroke to seek medical attention, we implemented stroke awareness campaigns targeting the Tandilean population (Appendix I), comprising “World Stroke Day” events, flyers (Appendix II), broadcasting an introductory video in the local TV (<https://www.youtube.com/watch?v=EvnD51njV-I>), a website (www.previstastudy.org), and frequent interviews in television, local newspapers (Appendix III), magazines, and radio before and during the study period.

Definitions of Stroke and Causes of Mortality

Cerebrovascular events were defined according to the standard WHO definition.⁷ IS was defined as focal neurological impairment of sudden onset of presumed vascular origin lasting more than 24 hours (or leading to death). TIA was defined as a focal neurological or retinal impairment of sudden onset, lasting less than 24 hours. Saws defined as a neurological dysfunction caused by a parenchymal brain hemorrhage evidenced on neuroimaging studies. Cerebrovascular events were classified as SAH in the presence of typical symptoms (e.g. headache, nausea, vomiting, decreased alertness) and

evidence of subarachnoid blood in neuroimaging studies, cerebrospinal fluid examination, or autopsy. Stroke cases without neuroimaging studies were classified as of 'undetermined cause'.

Cerebrovascular events were considered as incident (first ever in a lifetime) in the absence of a clinical history of stroke regardless of chronic head computerized tomography (CT) or magnetic resonance imaging (MRI) findings. Stroke cases with a history of TIA were regarded as first-ever strokes. After the exclusion of other potential causes of neurological deterioration, we defined stroke and TIA as recurrent if a period of neurological stability of ≥ 24 hours was demonstrated between the index stroke and the subsequent cerebrovascular event.

Death was categorized as: (1) neurological (herniation, edema, hydrocephalus, raised intracranial pressure, and recurrent stroke), (2) pneumonia (or any other chest infection), (3) other infections leading to death (urinary tract infection, infective endocarditis, sepsis), (4) cardio-respiratory (myocardial infarction, congestive heart failure, sudden death, and pulmonary embolism); (5) other causes (e.g., accident), and (6) unknown.⁸

Study Cohort

During the study period, 552 patients were identified as possibly having a stroke or a TIA (Figure I). Of these, 9 were later excluded by certified neurologists due to other diagnoses or reasons (1 brain tumor, 2 subdural hematomas, 1 lymphoma, 1 transient global amnesia, 1 duplicate patient, 2 patients were not Tandil residents), resulting in 543 first-ever and recurrent cases (421 with stroke and 122 with TIA). 442 were adjudicated as having a first-ever cerebrovascular event (334 with stroke and 108 with TIA). Mean age was 72.2 ± 14.4 years and 159 (47.6%) were men. Of 334 first-ever strokes, 262 (78.4%) were identified during hospitalization, 66 (19.8%) in outpatient clinics, and 6 (1.8%) through verbal autopsies. 251 (75.1%, 95%) were IS, 54 (16.2%) ICH, 17 (5.1%) SAH, and 12 (3.6%) strokes of undetermined cause. The six cases identified through verbal autopsies were classified as stroke of undetermined etiology.

Investigations in First-Ever Stroke and TIA Cases

Of 442 first-ever cerebrovascular events, 429 (97.1%) had at least one neuroimaging study (either CT or MRI), 417 (94.3%) had a head CT, and 119 (26.9%) had and brain MRI. Overall, 192 first-ever stroke and TIA cases underwent vascular imaging studies (43.4%), including 168 (38.0%) with carotid Doppler ultrasound and 50 (11.3%) with magnetic resonance angiography. 142 (32.1%) first-ever cases had at least an echocardiogram done, 139 (31.4%) were transthoracic and 8 (2.0%) were transesophageal.

Data Collection

Patients were assessed upon enrollment and through pre-scheduled telephonic interviews at day 30. As in prior studies in which not all investigators were certified for the National Institutes of Health Stroke Scale, stroke severity was determined by quantifying the number of neurological deficits.^{9,10} For this purpose, we used the 6S Score.¹¹ Every patient underwent CT or MRI scanning.

Statistical Analysis

Based on the 2010 National Census⁵, the number of persons-years at risk for first-ever stroke or TIA was calculated using the sum of the projected populations of Tandil for periods 2013-2014 (n=123871) and 2014-2015 (n=137311) as the denominator (total person-years at risk = 261182). Incidence rates of first-ever strokes (IS + ICH + SAH + stroke of undetermined cause) and TIAs were standardized to the Argentinean population. To enable comparison with other population-based studies, incidence was age-standardized by the direct method for Segi's European, European 2013, Segi's World, and WHO World populations.¹² We selected Segi's World population to compare incidence rates across studies conducted in Latin America because it was the standard population most consistently used across Latin American studies.¹³⁻¹⁶ We were unable to compare our data with that of the study performed in Rivera, Uruguay, because of a different population was used to standardize the results in the latter.¹⁷

We calculated case fatality rates and performed Kaplan Meier analyses to estimate survival curves. We used the log-rank test (Mantel-Cox) to compare survival between groups: first-ever vs. recurrent stroke, stroke types, males vs. females, and age quintiles (<58, 59-68, 69-76, 77-84, >84 years). We

used Cox proportional hazard analyses to estimate multivariate hazard ratios of death for first-ever stroke (adjusted for age, sex, vascular risk factors, stroke severity, and stroke types).

Ethical considerations

The study was conducted in accordance with Good Clinical Practice, all applicable subject privacy and confidentiality requirements, and the guiding principles of the declaration of Helsinki. For this purpose, all investigators, nurses, and administrative personnel were trained by certified instructors before the initiation of the study. All subjects' data were confidential and only authorized individuals had access to study documents. Written informed consent was obtained from every subject prior to participation in the study. The Central Ethics Committee at Ineco Foundation, and a Provincial Ethics Committee approved the study and the informed consent form. The database was registered at the Argentinean National Office for the Protection of Personal Data (<http://www.jus.gob.ar/datos-personales.aspx>).

Role of Funding source and Trial Administration

The study was funded by unrestricted research grants from Genzyme Corporate and LePetit Pharma. Roche SAQel and Boehringer Ingelheim collaborated with Good Clinical Practice training sessions, awareness campaigns, press releases, and communication materials. Funds were administered by Ineco Foundation. The sponsors had no role in the study design, data collection, data analysis, or data interpretation.

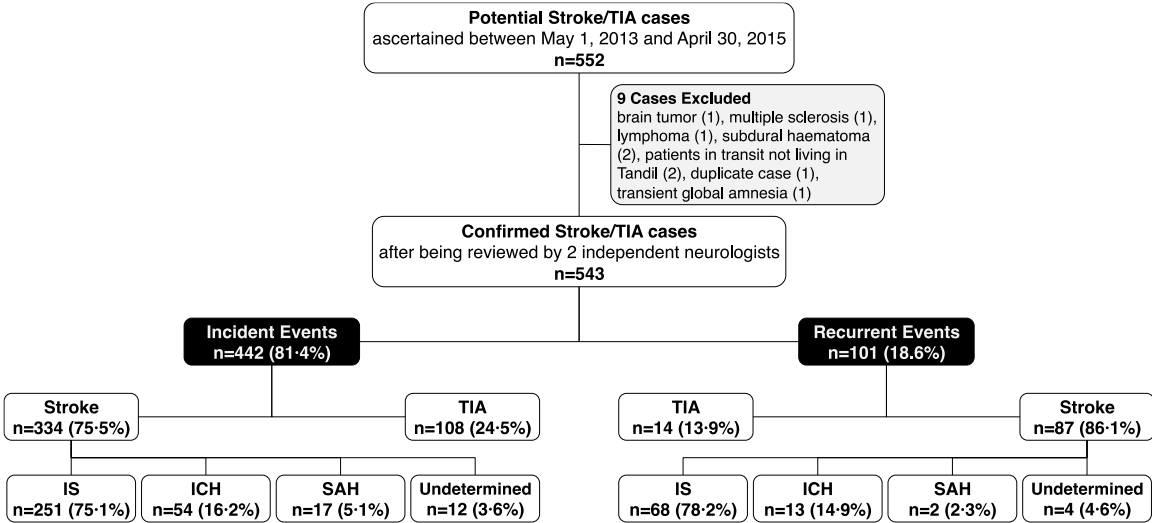
Table I. Age- and sex-specific incidence rates per 100000 of first-ever stroke for all strokes and by pathological type

Age groups (number-at-risk)	All First-ever Strokes		Ischemic Stroke		Intracerebral Hemorrhage		Subarachnoid Hemorrhage		Transient Ischemic Attack	
	n	Incidence rate	n	Incidence rate	n	Incidence rate	n	Incidence rate	n	Incidence rate
Women										
0-24 (49,193)	2	4.1 (0.5-14.7)	0	0.0 (0.0-7.5)	1	2.0 (0.1-11.3)	1	2.0 (0.1-11.3)	0	0.0 (0.0-7.5)
25-34 (20,022)	2	10.0 (1.2-36.1)	0	0.0 (0.0-18.4)	1	5.0 (0.1-27.8)	1	5.0 (0.1-27.8)	0	0.0 (0.0-18.4)
35-44 (17,197)	7	40.7 (16.4-83.9)	6	34.9 (12.8-75.9)	1	5.8 (0.1-32.4)	0	0.0 (0.0-21.5)	2	11.6 (1.4-42.0)
45-54 (14,816)	9	60.7 (27.8-115.3)	6	40.5 (14.9-88.1)	2	13.5 (1.6-48.8)	1	6.7 (0.2-37.6)	7	47.2 (19.0-97.3)
55-64 (13,433)	21	156.3 (96.8-239.0)	14	104.2 (57.0-174.9)	4	29.8 (8.1-76.2)	3	22.3 (4.6-65.3)	5	37.2 (12.1-86.9)
65-74 (10,197)	32	313.8 (214.7-443.0)	26	255.0 (166.6-373.6)	5	49.0 (15.9-114.4)	1	9.8 (0.2-54.6)	10	98.1 (47.0-180.4)
75-84 (7,076)	49	692.5 (512.3-915.5)	38	537.0 (380.0-737.1)	9	127.2 (58.2-241.4)	1	14.1 (0.4-78.7)	17	240.2 (140.0-384.7)
85+ (2,939)	53	1,803.2 (1,350.7-2 358.6)	43	1,463.0 (1,058.8-1,970.6)	5	170.1 (55.2-397.0)	2	68.0 (8.2-245.8)	5	170.1 (55.2-397.0)
All, crude (134,874)	175	129.8 (111.2-150.5)	133	98.6 (82.6-116.9)	28	20.8 (13.8-30.0)	10	7.4 (3.6-13.6)	46	34.1 (25.0-45.5)
Standardized Argentina		73.2 (61.7 - 86.1)		53.5 (43.9-64.4)		13.2 (8.4-19.6)		5.5 (2.4-10.5)		22.2 (15.8-30.1)
Men										
0-24 (50,749)	1	2.0 (0.0-11.0)	0	0.0 (0.0-7.3)	0	0.0 (0.0-7.3)	1	2.0 (0.0-11.0)	1	2.0 (0.0-11.0)
25-34 (19,767)	0	0.0 (0.0-18.7)	0	0.0 (0.0-18.7)	0	0.0 (0.0-18.7)	0	0.0 (0.0-18.7)	0	0.0 (0.0-18.7)
35-44 (16,318)	8	49.0 (21.2-96.6)	7	42.9 (17.2-88.4)	1	6.1 (0.2-34.1)	0	0.0 (0.0-22.6)	1	6.1 (0.2-34.1)
45-54 (14,106)	19	134.7 (81.1-210.3)	13	92.2 (49.1-157.6)	4	28.4 (7.7-72.6)	1	7.1 (0.2-39.5)	2	14.2 (1.7-51.2)
55-64 (11,685)	31	265.3 (180.3-376.6)	25	213.9 (138.5-315.8)	5	42.8 (13.9-99.9)	1	8.6 (0.2-47.7)	14	119.8 (65.5-201.0)
65-74 (8,438)	50	592.5 (439.8-781.2)	35	414.8 (288.9-576.9)	11	130.4 (65.1-233.2)	3	35.6 (7.3-103.9)	20	237.0 (144.8-366.1)
75-84 (4,240)	36	849.0 (594.6-1175.4)	28	660.3 (438.8-954.4)	5	117.9 (38.3-275.2)	0	0.0 (0.0-87.0)	19	448.1 (269.8-699.8)
85+ (1,004)	14	1,394.9 (762.6-2,340.4)	10	996.4 (477.8-1,832.4)	0	0.0 (0.0-367.5)	1	99.6 (2.5-555.1)	5	498.2 (161.8-1 162.6)
All, crude (126,307)	159	125.9 (107.1-147.0)	118	93.4 (77.3-111.9)	26	20.6 (13.4-30.2)	7	5.5 (2.2-11.4)	62	49.1 (37.6-62.9)
Standardized, Argentina		87.4 (74.6-102.6)		64.9 (53.7-77.8)		14.3 (9.3-20.9)		4.3 (1.6-9.1)		34.0 (26.0-43.6)

Table II. Case fatality rate and cause of death by first-ever stroke type and TIA

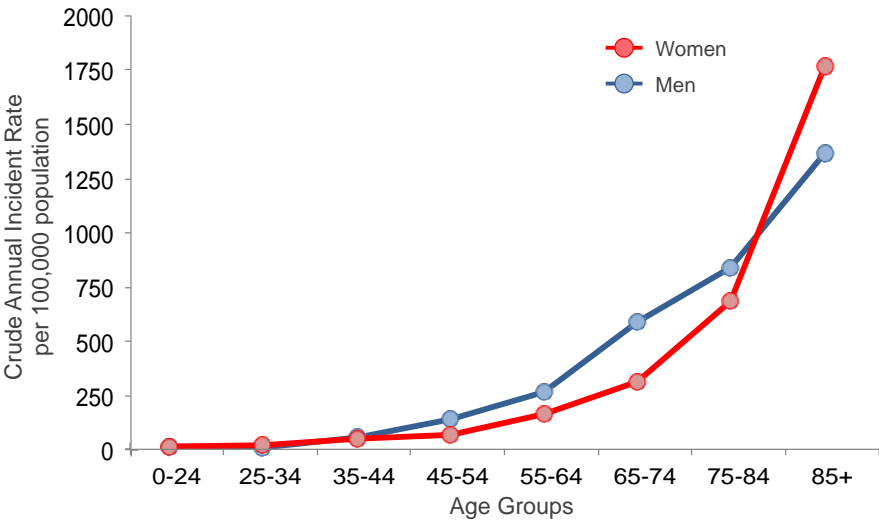
	All Events	All Strokes	IS	ICH	SAH	Stroke of Undetermined Cause	TIA
	(n=442)	(n=334)	(n=251)	(n=54)	(n=17)	(n=12)	(n=108)
Overall 30-day Case Fatality rate, n	69/442	67/334	37/251	13/54	8/17	9/12	2/108
%	15.6	20.1	14.7	24.1	47.1	75.0	1.9
95%CI	12.5 - 19.2	16.0 - 24.6	10.8 - 19.5	14.2 - 36.6	25.4 - 69.7	47.1 - 92.4	0.4 - 5.8
Neurological, n (%)	36/69 (52.2)	36/67 (53.7)	13/37 (35.1)	12/13 (92.3)	7/8 (87.5)	4/9 (44.5)	1/2 (50.0)
Pneumonia, n (%)	16/69 (23.2)	16/67 (23.9)	12/37 (32.5)	1/13 (7.7)	1/8 (12.5)	2/9 (22.2)	0/0 (0.0)
Other infections, n (%)	4/69 (5.8)	3/67 (4.4)	1/37 (2.7)	0/0 (0.0)	0/0 (0.0)	2/9 (22.2)	0/0 (0.0)
Cardiac, n (%)	6/69 (8.7)	5/67 (7.5)	5/37 (13.5)	0/0 (0.0)	0/0 (0.0)	0/0 (0.0)	1/2 (50.0)
Other, n (%)	5/69 (7.2)	5/67 (7.5)	4/37 (10.8)	0/0 (0.0)	0/0 (0.0)	1/9 (11.1)	0/0 (0.0)
Unknown, n (%)	2/69 (2.9)	2/67 (3.0)	2/37 (5.4)	0/0 (0.0)	0/0 (0.0)	0/0 (0.0)	0/0 (0.0)

Figure I. Description of study cohort



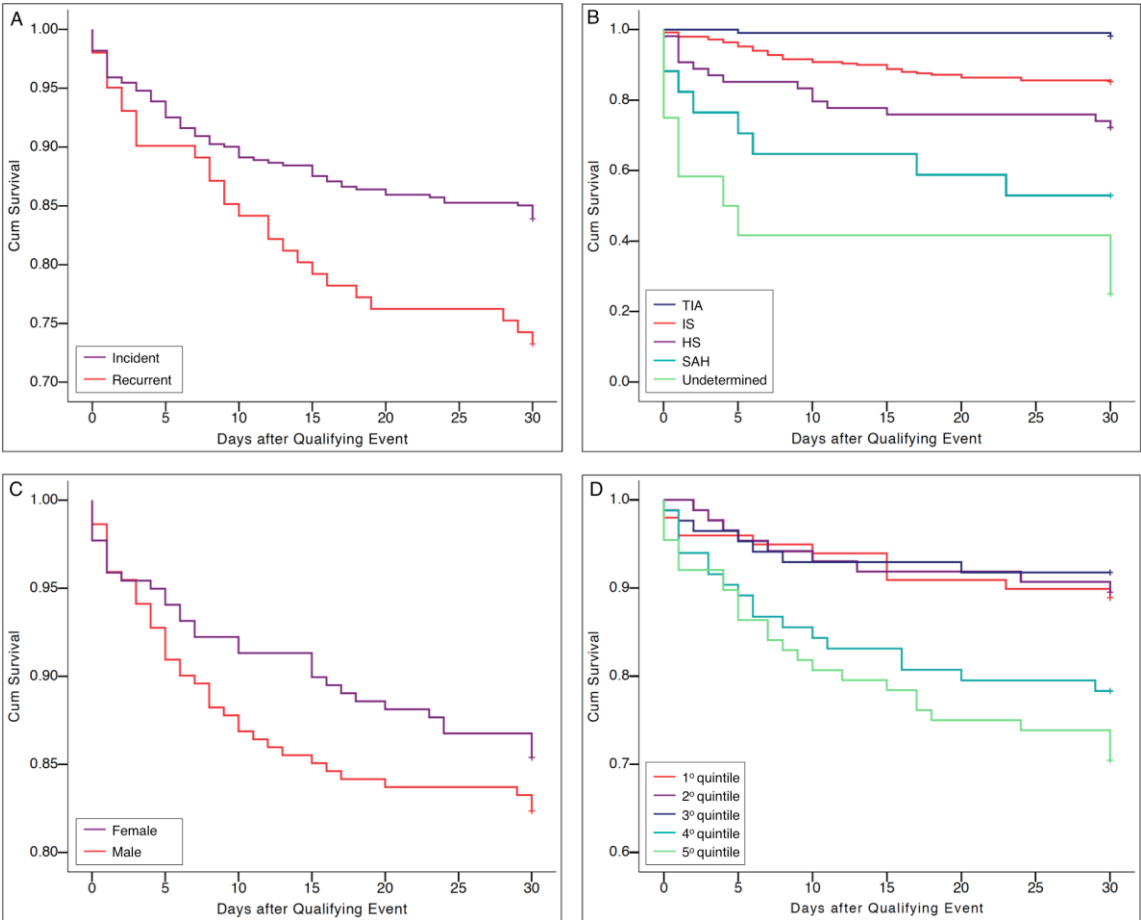
IS: ischemic stroke. **TIA:** transient ischemic attack. **ICH:** intracerebral hemorrhage. **SAH:** subarachnoid haemorrhage.

Figure II. First-ever crude annual incident of stroke in men and women



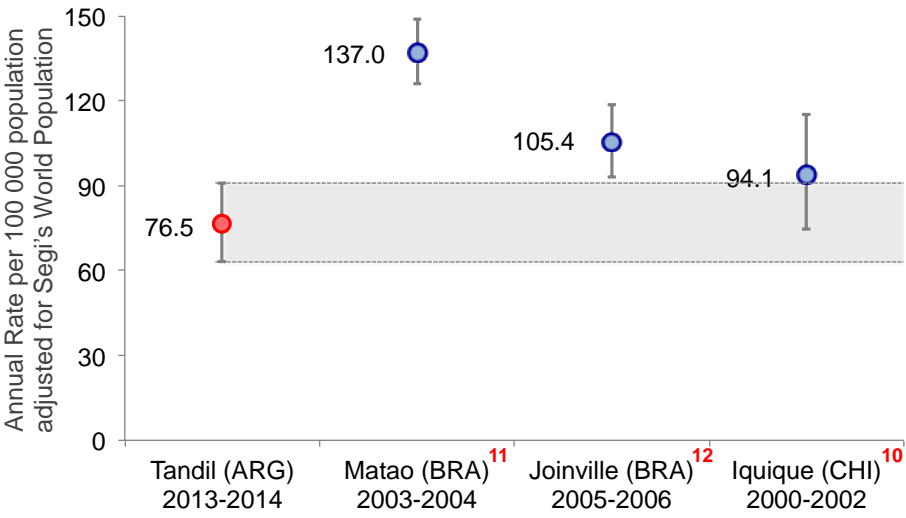
Curves represent crude first-ever stroke (ischemic, hemorrhagic, SAH, and stroke of undetermined cause) annual incident rates for men (125.9, 95%CI 107.1-147.0 per 100000) in blue and women (129.8, 95%CI 111.2-150.5 per 100000) in red.

Figure III. Kaplan Meier analysis of 30-day mortality by first-ever vs. recurrent events, stroke type, sex, and age



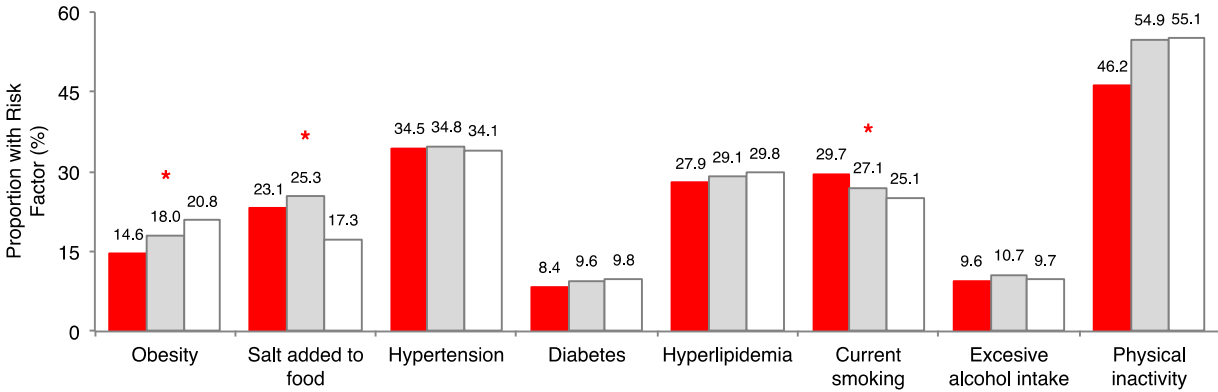
30-day Kaplan Meir curves for: (A) first-ever vs. recurrent events ($p=0.012$), (B) types of stroke ($p<0.001$), (C) men vs. women ($p=0.36$), and (D) age quintiles ($p<0.001$).

Figure IV. Compared annual first-ever stroke incidence rates among Latin American Countries



Error bars represent 95% confidence intervals. **ARG:** Argentina. **BRA:** Brazil. **CHI:** Chile.

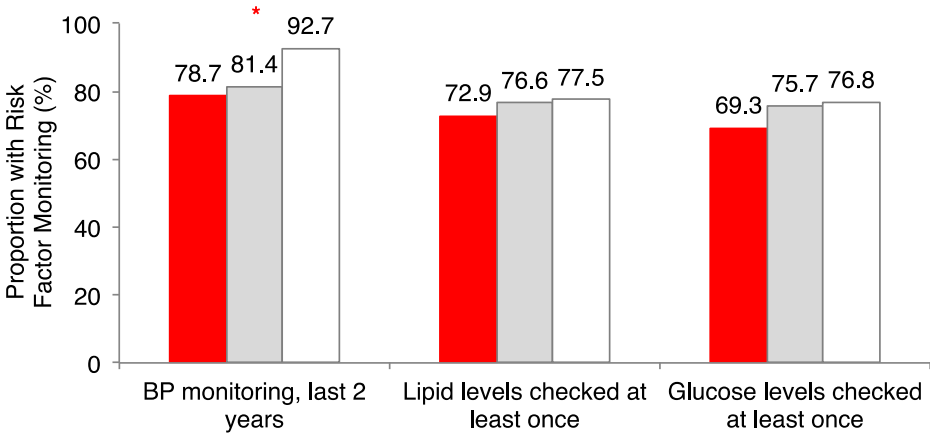
Figure V. Trends in the Prevalence of Risk Factors in the Argentinean Population 2005-2013



* denotes statistically significant trends (Chi square)

Source: www.msal.gov.ar/images/stories/publicaciones/pdf/11.09.2014-tercer-encuentro-nacional-factores-riesgo.pdf

Figure VI. Trends in Monitoring of Risk Factors in the Argentinean Population 2005-2013



* denotes statistically significant trends (Chi square)

Source: www.msal.gov.ar/images/stories/publicaciones/pdf/11.09.2014-tercer-encuentro-nacional-factores-riesgo.pdf

Appendix I. Stroke Awareness Campaign



Appendix II.
Stroke Awareness Flyer



ACV ACCIDENTE CEREBRO VASCULAR

¿Sabías que en Tandil se está llevando a cabo el primer registro de ataques Cerebrales de Argentina?

El programa para la Evaluación Epidemiológica del Stroke en Tandil, Argentina (PREVISTA) comenzó a registrar todos los casos de ACV ocurridos en Tandil desde el 1 de mayo de 2013.

Si usted o alguien que conoce, tuvo un ACV luego del 1º de abril de 2013 o sufrió alguno de los siguientes síntomas, por favor comuníquese al teléfono celular de PREVISTA para una consulta gratuita.

LOS SÍNTOMAS DEL ACV COMIENZAN DE GOLPE Y SUELEN AFECTAR A LA MITAD DEL CUERPO

- 1_ Debilidad súbita o adormecimiento de un brazo, una pierna o la mitad de la cara.
- 2_ Dificultad súbita para hablar o entender.
- 3_ Pérdida súbita de la visión en un ojo o en ambos
- 4_ Pérdida súbita del equilibrio o de la coordinación.
- 5_ Dolor súbito de cabeza y muy intenso

PREVISTA
0249 15 424 6331
info@previstastudy.org

URGENCIAS 107



Appendix III. Selected Media Appearances in National and Local Newspapers

Newspaper	Date	Web URL
La Nación	29-Oct-12	http://www.lanacion.com.ar/1521396
La Voz de Tandil	27-Oct-12	http://www.lavozdetandil.com.ar/ampliar_nota.php?id_n=42084
Perfil	27-Oct-12	http://www.perfil.com/ediciones/ciencia/-201210-722-0067.html
Nueva Era	23-Oct-13	http://nuevaeranet.com.ar/locales/nota-tandil-es-sede-de-una-investigacion-de-alcance-nacional-30645.html
El Diario de Tandil	2-Aug-13	http://www.eldiariodetandil.com/2013/08/02/tandil-es-la-primer-a-ciudad-de-argentina-en-estudiar-el-acv/
Telam	26-Oct-12	http://www.telam.com.ar/nota/42129/
La Capital	28-Oct-12	http://www.lacapital.com.ar/informacion-gral/Argentina-inicia-en-Tandil-un-estudio-para-conformar-su-propio-mapa-del-ACV-20121028-0010.html
Clarín	26-Oct-12	http://www.clarin.com/salud/Haran-primer-a-radiografia-ACV-pais_0_799120313.html

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