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## LETTER TO THE EDITOR

### The burden of Chikungunya in one coastal department of Colombia (Sucre): Estimates of the disability adjusted life years (DALY) lost in the 2014 epidemic



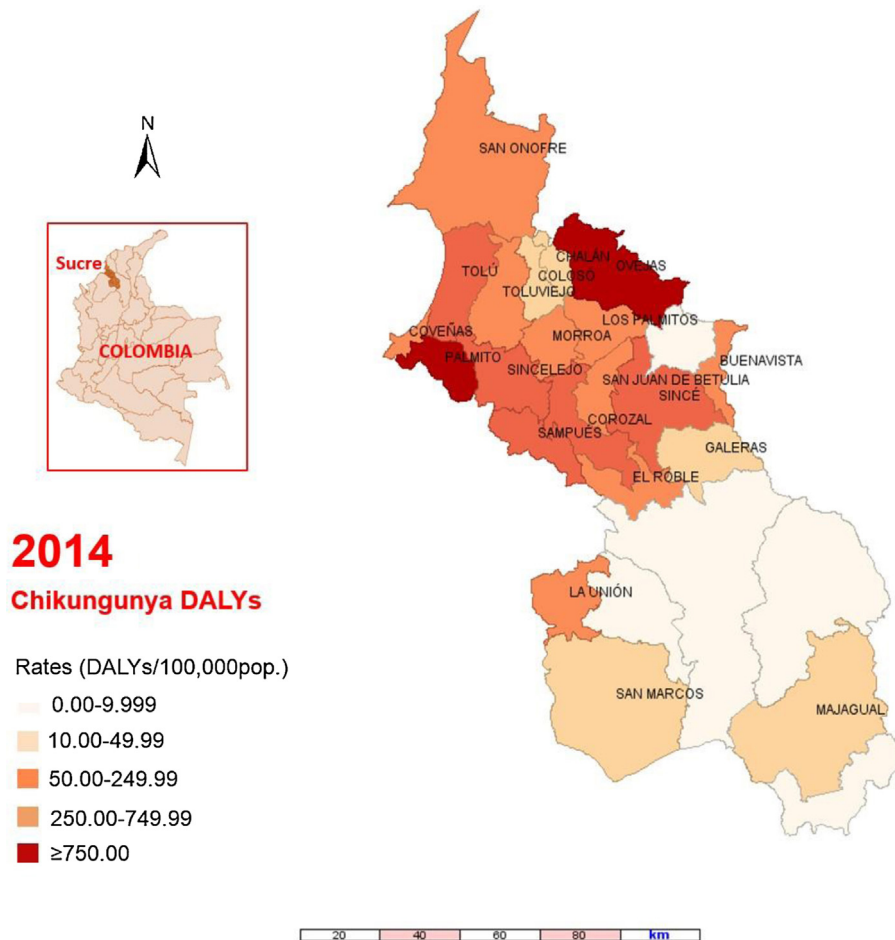
Along with the wide, and still uncontrolled, spread of Chikungunya virus disease (CHIK) in the new endemic areas of Latin America, an increase in the burden of its rheumatologic sequelae is expected [1,2]. Previous estimates suggest that of those patients who suffered from CHIK during 2014 in the region (855,890), between 385,835 and 429,058 patients (95%CI) would develop chronic inflammatory rheumatism (pCHIK-CIR), approximately 41.57% (95%CI 45.08–50.13), in a median time of 20.12 months [2]. Post-Chikungunya chronic inflammatory rheumatism (pCHIK-CIR) has been shown to deteriorate quality of life in physical, psychological and social dimensions [3,4], and the disease burden estimates in India during the 2006 epidemics have shown an important burden in terms of Disability Adjusted Life Years (DALYs) and economic impact [1,5,6]. In Colombia, CHIK spread is still uncontrolled, with many municipalities reporting increasing rates [7,8]. In 2014, there were 106,592 cases officially reported, with 13.8% from the Sucre department, which was the territory with the second highest disease incidence after Norte de Santander (1837.33 cases/100,000 pop) and the first territory where the Geographic Information System was used to map disease distribution [8]. However, disease burden in CHIK, assessed through DALYs, is still unknown in Latin America, Colombia and Sucre, as is the economic impact of the disease (see Fig. 1).

Consequently, we calculated the DALYs estimates for pCHIK-CIR in the region of Sucre (and its municipalities) (Fig. 1), Colombia and Latin America based on disease incidence and pCHIK-CIR estimations [2]. The DALYs were estimated using the method adopted by Murray for estimating

the global burden of diseases ( $DALYs = YLL + YLD$ ;  $YLL = 0$  assuming not yet deaths;  $YLD = I * DW * L$ ) [9]. Although no disability weight (DW) is available for pCHIK-CIR, we used the disability weight available for rheumatoid arthritis (0.233), which has been used in previous estimates for CHIK DALYs (e.g., in India) [1,5,6]. The expected incident cases progressing to chronic disease (I) and the duration of chronic disease (L) were assumed to be as previously reported (Table 1) [2].

Although there were limitations related to the source of information and the lack of adjustment by gender and age, these are, to the best of our knowledge, the first DALYs estimates from pCHIK-CIR in Latin America. Our results at the first administrative level in Sucre, Colombia (308 DALYs/100,000 pop), are considerably higher than the estimations previously reported in India at the same administrative level from Andhra Pradesh, 2006 (using similar parameters), when shown per 100,000 pop (1.88; 163 times higher) [1]. They estimated the national rate of DALYs/100,000 pop to be 4.25, while for Colombia in 2014, we estimated this the rate to be 36 (8.6 times higher). This caught our attention because our estimates do not include DALY for the acute phase of CHIK and therefore would be even higher. Additionally, the deaths that have been reported in 2015 would increase the DALYs in the territory, the country and the region. If the estimated annual cost for the phases of the disease was US\$12,400,000 for the state of Andhra Pradesh [6], then we would expect higher costs in Sucre and in Colombia.

Hence, in accordance with our results, the expected DALYs due to pCHIK-CIR in Colombia are 2/3 of the burden of ischemic heart disease [10]. Our estimates are consistently higher than those previously reported, which raises alarms regarding the need to promptly establish control measures and to be prepared to face future pCHIK-CIR epidemics.



**Figure 1** Geographic distribution of pCHIK-CIR-estimated DALYs (lower value for 95%CI) by population (DALYs/100,000 pop) in the Sucre department, Colombia, 2014.

**Table 1** Estimated DALYs (Disability Adjusted Life Years) related to pCHIK-CIR incidence by municipalities in the Sucre department, Colombia, 2014.

Municipalities	Cases	Population	Projected number of pCHIK-CIR (95%CI) <sup>a</sup>		DALYs (95%CI)		DALYs per 100,000 (95%CI)	
			Low	Upper	Low	Upper	Low	Upper
Palmito	818	13,427	369	410	144	161	1075	1195
Ovejas	985	21,142	444	494	174	193	822	914
Sincé	1289	33,361	581	646	227	253	682	758
Tolú	1232	32,731	555	618	217	242	664	739
Sincalejo	7349	271,355	3313	3684	1297	1442	478	531
Corozal	1351	61,991	609	677	238	265	385	428
Sampues	631	37,787	284	316	111	124	295	328
San Juan de Betulia	172	12,529	78	86	30	34	242	269
Coveñas	105	13,300	47	53	19	21	139	155
La Unión	87	11,073	39	44	15	17	139	154
Los Palmitos	140	19,276	63	70	25	27	128	143
Buonavista	69	9502	31	35	12	14	128	142
Tolú Viejo	109	18,900	49	55	19	21	102	113
El Roble	44	10,432	20	22	8	9	74	83
Morroa	50	14,263	23	25	9	10	62	69
San Onofre	149	49,784	67	75	26	29	53	59
Coloso	16	5878	7	8	3	3	48	53

Table 1 (Continued)

Municipalities	Cases	Population	Projected number of pCHIK-CIR (95%CI) <sup>a</sup>		DALYs (95%CI)		DALYs per 100,000 (95%CI)	
			Low	Upper	Low	Upper	Low	Upper
Chalán	11	4341	5	6	2	2	45	50
San Marcos	68	56,384	31	34	12	13	21	24
Galerías	20	19,866	9	10	4	4	18	20
Majagual	19	33,077	9	10	3	4	10	11
San Pedro	8	16,075	4	4	1	2	9	10
Sucre municipality	10	22,374	5	5	2	2	8	9
Caimito	2	11,962	1	1	0	0	3	3
San Benito Abad	3	25,171	1	2	1	1	2	2
Guaranda	1	17,201	0	1	0	0	1	1
Unknown	3	—	1	2	1	1	—	—
Whole department	14741	843,182	6645	7390	2601	2893	308	343
Colombia	83,832	41,445,593	37,791	42,025	14,793	16,450	36	40
Latin America	855,890	593,337,955	385,835	429,058	151,031	167,950	25	28

<sup>a</sup> 95%CI = 95% confidence interval.

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