

SUPPLEMENTARY MATERIAL

Table S1. Epidemiological Repository of Catalonia (REC, in Catalan), an electronic registry used by the Epidemiological Surveillance Network of Catalonia (XVEC, in Catalan)

As instituted by Law 203/2015 (September 15, 2015), personnel from the Epidemiological Surveillance Network of Catalonia (XVEC) manage the mandatory declaration of diseases and epidemic outbreaks. Along with the notification, healthcare professionals enclose a questionnaire that describes epidemiological, behavioural, clinical, and geographical parameters. The notification comes from two main sources. The first is the Mandatory Declaration of Disease (MDO) system, where a healthcare professional reports a suspected or confirmed case using established case definitions. The notification procedure is done electronically or, alternatively, by means of the individualized notice form on paper. In compliance with article 13 of law 67/2010 (25 May 2010) of the Health Department of Government of Catalonia, nominal notification of syphilis, gonorrhoea, and LGV have been reported to the MDO since 2006, chlamydia since 2015 and congenital syphilis since 1997. The second source of notification is the Microbiological Notification System of Catalonia (SNMC), which collects microbiological information on selected diseases. Notifications on chlamydia and gonorrhoea are also reported through the SNMC. Notification of new HIV infections was done on a voluntary basis between 2001 and 2009, and mandatory and nominal since 2010.

Table S2. STI case definitions from the Public Health Agency of Catalonia, Department of Health, Generalitat de Catalunya.

CHLAMYDIA: 1) Laboratory criteria for diagnosis: Isolation of *Chlamydia trachomatis* by culture in a sample of the genitourinary tract, anal or conjunctiva, or clinical sample; or demonstration of *C. trachomatis* by detection of specific antigens or by direct immunofluorescence (DFA) in a clinical sample; or detection of specific genomic fragments of *C. trachomatis* in a clinical specimen. **2) Confirmed case:** Person with compatible laboratory criteria. **3) Probable case:** Person with clinically compatible criteria, especially if it is epidemiologically related.

GONORRHOEA: 1) Laboratory criteria for diagnosis: Isolation by culture of *Neisseria gonorrhoeae* in a clinical specimen, or detection of specific genomic fragments of *N. gonorrhoeae* in a clinical specimen, or microscopic detection of gram-negative intracellular diplococci in urethral exudates in men. **2) Confirmed case:** Person with compatible laboratory criteria. **3) Probable case:** Person with clinically compatible criteria, especially if it is epidemiologically related.

SYPHILIS: 1) Laboratory criteria for diagnosis: Demonstration of *Treponema pallidum* by dark field microscopy, by direct immunofluorescence (DFA), of genomic fragments, in lesion secretions. Detection of antibodies against *T. pallidum* by specific tests (TPHA, TPPA or EIA) and, in addition, one of the following methods: FTA-ABS, EIA immunotransference, non-specific reactive serological test (VDRL, RPR), detection of IgM antibodies -TP. **2) Confirmed case:** Person with compatible laboratory criteria. **3) Probable case:** Person with clinically compatible criteria, especially if it is epidemiologically related.

LGV: 1) Laboratory criteria for diagnosis: Detection of specific genomic fragments of *C. trachomatis* in a clinical sample, and in addition Identification of serovar L1, L2 or L3. **2) Confirmed case:** Person with compatible laboratory criteria. **3) Probable case:** Person with clinically compatible criteria, especially if it is epidemiologically related.

Notifiable diseases and epidemic outbreaks. Department of Health, Public Health Agency of Catalonia, Generalitat de Catalunya.
Available at: <https://canalsalut.gencat.cat/ca/professionals/vigilancia-epidemiologica/malalties-de-declaracio-obligatoria-i-brots-epidemics/> (accessed 20 Jun 2021).

Table S3. Details on study variables.

The socio-demographic variables used in our analysis were sex, age at notification, educational level, deprivation index and country of birth. We used a basic health area (ABS) deprivation index calculated by the Agency for Health Quality and Assessment of Catalonia (AQUAS), attributed to each patient according to their address of residence (categorized in quintiles, first quintile for the ABS with lower deprivation index)^a. We extracted the classification of ABS as urban or rural (ABS urbanicity) from another deprivation index at ABS level provided by the Primary Health Care Information Systems (SISAP), MEDEA index^b. Country of birth were categorized by regions adapting for the study those used by WHO. We categorized sexual preference separately for men and women as follows: Men (two groups): MSM (include men who have sex with men, bisexual men and transgender men) and men who have sex with women only (MSW); Women (two groups): WSW (includes women who have sex with women, bisexual women, transgender men) and women who have sex only with men (WSM). Some variables from the epidemiological questionnaire showed high percentages of missing values such are education level, country of birth, and sexual preference (76%, 57%, and 64% respectively, see table 1 and S4). The clinical variables were reinfections, multiple STI episodes (when same persona had more than one during the study period), and coinfection with HIV. Reinfection was defined as more than one episode of the same specific STI during all the study follow-up, but defined differently for each STI, depending on the number of days between successive episodes after the first infection in the same individual; more than 364 for syphilis (although definitive criteria for cure or failure have not been well established yet) and 119 days for gonorrhoea, chlamydia and LGV, respectively^c. As a geographical variable, we categorized people based on the seven Catalan health regions of their ABS of residence: Alt Pirineu and Aran, Barcelona, Camp de Tarragona, Catalunya central, Girona, Lleida and Terres de l'ebre.

^a Agency for Health Quality and Assessment of Catalonia. Nou indicador socioeconòmic per al finançament de les ABS. Observatori del Sistema de Salut de Catalunya. 2017.http://observatorisalut.gencat.cat/ca/observatori-desigualtats-salut/indicador_socioeconomic_2015/ (accessed 6 Aug 2020).

^b Domínguez-Berjón MF, Borrell C, Cano-Serral G, et al. Construcción de un índice de privación a partir de datos censales en grandes ciudades españolas (Proyecto MEDEA). *Gac Sanit* 2008;22:179–87. doi:10.1157/13123961

^c CDC - STD Treatment. <https://www.cdc.gov/std/treatment/default.htm> (accessed 14 Feb 2021).

Table S4. Denominators for STI incidence rates calculations.

Data source for denominators (a-q) in Table 2 (main text): the Statistical Institute of Catalonia (IDESCAT) [data provided by IDESCAT on 23 June 2020]:

^aTotal female population in Catalonia: 3,845,630 in 2017, 3,869,739 in 2018, and 3,905,094 in 2019.

^bTotal male population in Catalonia: 3,710,200 in 2017, 3,730,326 in 2018, and 3,770,123 in 2019.

^cTotal population <30 yrs in Catalonia: 2,322,227 in 2017, 2,339,673 in 2018, and 2,368,830 in 2019.

^dTotal population ≥ 30 yrs in Catalonia: 5,233,603 in 2017, 5,260,392 in 2018, and 5,306,387 in 2019.

^eTotal male population <30 yrs in Catalonia: 1,187,850 in 2017, 1,197,499 in 2018, and 1,215,583 in 2019.

^fTotal male population ≥ 30 yrs in Catalonia: 2,522,350 in 2017, 2,532,827 in 2018, and 2,554,540 in 2019.

^gTotal female population <30 yrs in Catalonia: 1,134,377 in 2017, 1,142,174 in 2018, and 1,153,247 in 2019.

^hTotal female population ≥ 30 yrs in Catalonia: 2,711,253 in 2017, 2,727,565 in 2018, and 2,751,847 in 2019.

^lTotal population in Catalonia: 7,555,830 in 2017, 7,600,065 in 2018, and 7,675,217 in 2019. Used as a denominator to compute STI rates, total and by disease, and rates according ABS urbanicity category.

^jTotal population in Alt pirineu i Aran: 71,958 in 2017, 71,888 in 2018, and 72,276 in 2019.

^kTotal population in Barcelona: 4,972,179 in 2017, 5,000,125 in 2018, and 5,047,597 in 2019.

^lTotal population in Camp de Tarragona: 598,683 in 2017, 603,743 in 2018, and 611,950 in 2019.

^mTotal population in Catalunya Central: 515,578 in 2017, 519,819 in 2018, and 526,544 in 2019.

ⁿTotal population in Girona: 857,877 in 2017, 865,282 in 2018, and 875,722 in 2019.

^oTotal population in Lleida: 359,729 in 2017, 360,497 in 2018, and 362,428 in 2019.

^pTotal population in Terres de l'Ebre: 179,826 in 2017, 178,711 in 2018, and 178,700 in 2019.

^qNA=Not available denominators.

Table S5. Distribution of epidemiological characteristics in cases of chlamydia, gonorrhoea, syphilis or lymphogranuloma venerum (LGV) in Catalonia, 2017–2019 (N= 42,283).

	All STI (N=42,283)		Chlamydia (N=21,202)		Gonorrhoea (N=13,362)		Syphilis (N=6,975)		LGV (N =744)	
	N	%	N	%	N	%	N	%	N	%
Education										
Primary school or less	1492	3.53	1034	4.88	334	2.5	4	0.54	120	1.72
Secondary education	5168	12.22	3860	18.21	976	7.3	30	4.03	302	4.33
University	3299	7.8	2450	11.56	591	4.42	31	4.17	227	3.25
Missing	32324	76.45	13858	65.36	11461	85.77	679	91.26	6326	90.7
Country/region of birth										
Spain	13273	31.39	7534	35.53	3890	29.11	282	37.9	1567	22.47
Western countries ^a	537	1.27	246	1.16	157	1.17	17	2.28	117	1.68
North Africa	502	1.19	306	1.44	152	1.14	0	0	44	0.63
Sub-Saharan Africa	193	0.46	123	0.58	53	0.4	3	0.4	14	0.2
Latin America and the Caribbean	3281	7.76	2129	10.04	719	5.38	53	7.12	380	5.45
Eastern Europe and Central Asia	334	0.79	218	1.03	71	0.53	2	0.27	43	0.62
Asia (not central) ^b	216	0.51	145	0.68	50	0.37	1	0.13	20	0.29
Missing	23947	56.64	10501	49.53	8270	61.89	386	51.88	4790	68.67
Health region of residence										
Alt pirineu i Aran	56	0.13	30	0.14	14	0.1	0	0	12	0.17
Barcelona	35215	83.28	17108	80.69	11566	86.56	708	95.16	5833	83.63
Camp de Tarragona	1655	3.91	930	4.39	390	2.92	10	1.34	325	4.66
Catalunya central	1425	3.37	861	4.06	371	2.78	8	1.08	185	2.65
Girona	2784	6.58	1595	7.52	730	5.46	8	1.08	451	6.47
Lleida	863	2.04	499	2.35	241	1.8	5	0.67	118	1.69
Terres de l'ebre	285	0.67	179	0.84	50	0.37	5	0.67	51	0.73

Western countries^a: Western Europe, North America, Australia, and New Zealand, Asia (not central)^b: South-eastern Asia, Southern Asia, and Western Asia.