

Table I Main variables documented in COLCHIC and SCOLA

Variable	Category of information ¹	Type of data	Definition
COLCHIC and SCOLA			
Laboratory	E	Category	Organization owning the file
Year	E	Date	Year of reception of intervention request (COLCHIC) or of collecting samples (SCOLA)
File number	E	Category	Number of intervention request file or establishment concerned
SIRET	E	Category	Administrative identification no. of establishment as a geographically localized entity
Establishment – post code – town	E	Category	Address of establishment
NAF	E	Category	Nomenclature code of French Activities (NAF rev. 02, 2008)
Workforce	E	Category	Number of employees in establishment by sector??
Collected by	SC	Category	Designation of the entity (COLCHIC) or body (SCOLA) responsible for the sampling campaign in the establishment
Sampling date	SC	Date	Date of sampling in the establishment
Reference / Sample number	SC	Category	Reference of sample given by sampler
Sampling method	SC	Category	Characterization of technique used to take the sample
Sampling device	SC	Category	Characterization of the sampling device (type and dimensions)
Flow rate (L/min)	SC	Continue	Flow rates measured at the start and end of active sampling
Objective**	SC	Category	Type of sample taken (environment or individual; quantitative or qualitative)
Representativeness**	SC	Category	Representativeness of sample indicated by sampler taking into account his or her knowledge of exposure conditions
Type of workplace**	Ex	Category	Brief description of type of workplace in which sample was taken
Global ventilation**	Ex	Category	Brief description of the general ventilation of workplace
Collective protection**	Ex	Category	Description of collective protection equipment used and subjected to sampling
Task	SC	Category	General description of type of task performed during sampling
Occupation*	SC	Category	Identification of type of trade performed by employee (Employment Agency Operational Directory of Trades and Jobs (ROME version 1.2 – 1999))
Personal protective equipment	SC	Category	Description of personal protective equipment used
Duration (min)	SC	Continue	Duration of sampling in minutes
Observations on sampling	SC	Text	Observations recorded during sampling
Laboratory	AC	Category	Laboratory responsible for the analysis requested
Chemical agent	AC	Category	Chemical agent measured during the analysis
Analysis technique	AC	Category	Analysis technique used to quantify chemical agent
COLCHIC alone			
Origin of request	E	Category	Indication of origin of the request for intervention
Reason for request	E	Category	Indication of reason for the request for intervention
Workplace area	E	Text	General localization of place where samples were taken
Estimated production activity*	Ex	Category	Description of production activity of workplace where samples were taken
Ambient temperature	Ex	Category	Range of ambient temperature of workplace when taking the samples
Type of process*	Ex	Category	Description of type of process generating the chemical agents causing exposure
Frequency of exposure*	Ex	Category	Characterization of the frequency of exposure to the category of product or process causing exposure
CAPPROEX*	Ex	Category	Category of product or process causing occupational exposure
Utilization T°*	Ex	Text	Utilization temperature of product causing exposure

¹ E: administrative information on establishment

SC: sampling conditions

Ex: exposure conditions

AC: analytic conditions

* added in 2002 in COLCHIC

** modified in 2002 in COLCHIC

Table II Distribution of records according to categories of the main variables in COLCHIC and SCOLA

Variable of interest	COLCHIC	SCOLA
<i>Personal protection equipment</i>		
Adapted respiratory protection	14% (n = 109,097)	33% (n = 50,021)
No adapted respiratory protection	60% (n = 461,717)	31% (n = 46,928)
Not filled-in	26% (n = 199,931)	36% (n = 55,537)
<i>Collective protection equipment</i>		
Absence of localized capture	47% (n = 360,523)	27% (n = 40,814)
Presence of localized induction (non-enveloping)	28% (n = 216,438)	23% (n = 34,838)
Presence of localized enveloping capture	14% (n = 108,878)	5% (n = 8,005)
Large ventilated booth	1.7% (n = 12,891)	9% (n = 14,203)
Significant distance of employee from emission source	0.2% (n = 1,388)	0.8% (n = 1,338)
System non-operational	0.1% (n = 912)	0.2% (n = 330)
Not filled-in	9% (n = 69,715)	35% (n = 52,958)
<i>Global ventilation</i>		
Presence of general mechanical ventilation	28% (n = 216,893)	45% (n = 68,950)
Absence of mechanical ventilation	35% (n = 268,699)	26% (n = 39,575)
Presence of localized capture and absence of general mechanical ventilation	25% (n = 192,692)	16% (n = 23,963)
System non-operational	0.2% (n = 1,362)	0% (n = 488)
Not filled-in	11.8% (n = 91,099)	13% (n = 19,510)
<i>Type of workplace</i>		
In open air	3.6% (n = 27,679)	9% (n = 12,763)
Confined space	1% (n = 6,947)	35% (n = 53,405)
Booth or control room	1.4% (n = 10,445)	2% (n = 2,972)
Standard industrial premises	73% (n = 563,209)	44% (n = 67,568)
Underground gallery, tunnel	0.5% (n = 3,464)	0% (n = 384)
Other non-classified types	1% (n = 7,057)	7% (n = 10,601)
Archives: partially open	12% (n = 93,926)	0% (n = 0)
Not filled-in	7.5% (n = 58,018)	3% (n = 4,793)
<i>Representativeness</i>		
Development of a sampling or analysis technique	0.3% (n = 1,974)	0% (n = 0)
For comparison with a TWA	30% (n = 231,772)	91% (n = 139,144)
For comparison with a STEL	1.2% (n = 7,719)	9% (n = 13,342)
For determining the exposure for an operation or task	62% (n = 481,505)	0% (n = 0)
For determining the maximum exposure value	0.2% (n = 1,579)	0% (n = 0)
For measuring the concentration at a fixed point without concern given for comparison with a limit value	4% (n = 29,320)	0% (n = 0)
For evaluating a respiratory protection system	0% (n = 175)	0% (n = 0)
For identifying substances ("screening")	2.3% (n = 16,701)	0% (n = 0)
For determining qualitative exposure and non-representative samples	0.3% (n = 1,974)	0% (n = 0)
<i>Number of employees</i>		
1 to 19 employees	13% (n = 100,985)	14% (n = 21,703)
20 to 49 employees	10% (n = 78,888)	25% (n = 38,035)
50 to 199 employees	14% (n = 106,577)	26% (n = 39,899)
200 or more	8% (n = 64,212)	35% (n = 52,849)
Not documented	55% (n = 420,083)	0% (n = 0)

Table III Descriptive statistics for personal measurements by chemical agent and sample duration in COLCHIC (1987-2012) and SCOLA (2007-2012)

Chemical agent	COLCHIC								SCOLA							
	Long term duration				Short term duration				Long term duration				Short term duration			
	n	Duration (min)	<LOQ ¹ >OELV ²		n	Duration (min)	<LOQ ¹ >OELV ²		n	Duration (min)	<LOQ ¹ >OELV ²		n	Duration (min)	<LOQ ¹ >OELV ²	
		C50 [C25-C75] ³	(%)	(%)		C50 [C25-C75] ³	(%)	(%)		C50 [C25-C75] ³	(%)	(%)		C50 [C25-C75] ³	(%)	(%)
1-methoxy- propane-2-ol	2,882	107 [77-207]	23	2	1,251	35 [21-49]	15	5	394	375 [253-431]	45	0.5	282	15 [15-15]	69	2
Acetone	14,093	124 [82-357]	8	0	5,697	37 [25-48]	5	2	740	384 [304-432]	21	0	747	15 [10-15]	37	0
Anhydrous ammonia	218	140 [106-196]	1	18	94	15 [14-39]	3	45	529	415 [370-449]	13	0.8	320	15 [14-15]	52	0
Asbestos	3,588	137 [100-215]	34	0	1,203	18 [10-40]	31	0	35,758	60 [60-60]	70	3	9,243	26 [15-35]	64	16
Benzene	2,104	295 [108-450]	46	10	1,394	32 [20-45]	16	11	3,714	414 [351-445]	74	0.4	334	15 [13-19]	84	1
Butanone	9,041	108 [77-220]	14	2	4,658	37 [26-48]	8	4	828	376 [270-425]	23	0.6	862	15 [10-15]	40	0
Cristobalite	5,900	351 [271-404]	86	3	56	37 [29-44]	82	43	5,606	420 [370-458]	92	0.4	90	17 [9-31]	94	6
Ethylbenzene	5,316	108 [79-233]	24	0.7	3,447	35 [24-47]	10	3	1,954	409 [338-445]	62	0.1	700	15 [7-15]	80	0.4
Methanol	815	138 [86-480]	36	2	454	32 [16-48]	13	12	448	364 [202-420]	60	1	176	15 [5-15]	70	0
N-hexane	2,582	122 [76-360]	28	2	1,808	35 [24-46]	10	4	1,121	418 [372-450]	45	0.7	174	15 [10-15]	70	0
Lead	12,558	175 [120-240]	18	35	1,313	40 [24-50]	15	46	3,456	390 [327-435]	28	15	191	19 [11-30]	68	0
Alveolar particulate fraction	11,962	330 [239-389]	4	5	171	39 [29-50]	16	29	6,587	410 [351-450]	20	3	110	21 [13-39]	72	3
Inhalable particulate fraction	35,366	191 [132-292]	4	0	2,938	40 [26-50]	10	0	3,873	365 [291-413]	19	6	121	25 [15-35]	64	3
Quartz	6,695	349 [269-400]	36	15	65	36 [22-42]	65	32	5,855	421 [372-459]	53	5	91	17 [9-31]	91	7
Toluene	12,955	117 [80-295]	18	10	7,319	35 [23-47]	8	14	2,657	405 [324-444]	46	2	1,424	15 [9-15]	56	5
Wood dust	9,186	282 [194-370]	3	46	159	35 [20-50]	4	83	15,766	380 [325-430]	16	19	289	27 [14-39]	67	12
Xylene	8,530	105 [78-224]	21	1	5,302	35 [23-47]	10	3	2,189	411 [350-446]	50	0.1	984	15 [7-15]	69	0.4

¹Limit of quantification; ²Occupational exposure limit value; ³Centile 50, 25 and 75

Table IV Comparison of exposure levels in classes of activity (industrial sector, occupation and task) common to COLCHIC and SCOLA over the period 2007 to 2012

Industrial sector

Chemical agent	N ¹	% included SCOLA ²	% included COLCHIC ³	Exceedance			Geometric Mean			Non-detects		
				Bias ⁴	Median SCOLA ⁵	Median COLCHIC ⁶	Bias GM ⁷	Median GM SCOLA ⁸	Median GM COLCHIC ⁹	Bias ND ¹⁰	Median ND SCOLA ¹¹	Median ND COLCHIC ¹²
Acetone	11	65	67	0.37	0	0	80	1.9	12	-0.41	24	14
Toluene	17	48	70	-3.31	0.26	0.94	-1,040	0.32	0.85	7.72	26	30
Butanone	10	67	71	0.35	0	0	-105	3.7	3	9.57	19	28
Xylene	13	49	66	0.68	0	0	43	0.83	2	3.72	21	21
Lead	16	87	87	3.69	5.1	11	38	1.1	3.4	20.9	26	55
Cristobalite	13	89	84	0.62	0	0	53	0.0018	0.0057	-4.50	96	95
Wood (dust)	18	89	97	28.1	19	46	56	0.42	1	-11.3	10	1.1
Quartz	13	89	84	-2.45	4.8	7.4	32	0.005	0.012	-9.57	53	40

Occupation

Chemical agent	N ¹	% included SCOLA ²	% included COLCHIC ³	Exceedance			Geometric Mean			Non-detects		
				Bias ⁴	Median SCOLA ⁵	Median COLCHIC ⁶	Bias GM ⁷	Median GM SCOLA ⁸	Median GM COLCHIC ⁹	Bias ND ¹⁰	Median ND SCOLA ¹¹	Median ND COLCHIC ¹²
Toluene	15	60	47	0.80	0	0	50	0.16	1.4	9.28	26	38
Xylene	10	50	51	1.18	0	0	44	0.34	1	-4.88	48	32
Lead	15	51	66	0.67	19	13	7	3.2	4.9	14.6	19	37
Cristobalite	16	49	71	0.12	1	0.21	-404	0.0017	0.0033	0.03	93	94
Wood (dust)	12	75	94	12.3	24	35	43	0.46	0.79	-9.17	9.2	1.6
Quartz	16	48	71	6.21	4.7	11	39	0.006	0.016	-13.3	47	27

Task

Chemical agent	N ¹	% included SCOLA ²	% included COLCHIC ³	Exceedance			Geometric Mean			Non-detects		
				Bias ⁴	Median SCOLA ⁵	Median COLCHIC ⁶	Bias GM ⁷	Median GM SCOLA ⁸	Median GM COLCHIC ⁹	Bias ND ¹⁰	Median ND SCOLA ¹¹	Median ND COLCHIC ¹²
Toluene	13	57	39	2.36	0	1.7	83	0.13	1.2	-2.28	36	33
Xylene	13	49	47	1.03	0	0	59	0.28	2.4	-8.00	38	26
Lead	17	42	40	-9.14	21	11	-1,25	7.2	8.3	22.68	14	41
Cristobalite	18	32	45	0.69	0	0	-10	0.0010	0.0028	-3.79	95	94
Wood (dust)	10	74	93	15.6	19	37	45	0.39	0.81	-8.77	12	1.1
Quartz	18	32	45	5.21	4.5	6.9	69	0.004	0.013	-18.19	49	34

1: number of classes categories in common with more than 20 measures in the two databases

2: Percentage of SCOLA records included in the comparison (%)

3: Percentage of COLCHIC records included in the comparison (%)

4: Median absolute difference in exceedance fraction of OELV (%)

5: Median of exceedance fraction of OELV across activity categories in SCOLA (%)

6: Median of exceedance fraction of OELV across activity categories in COLCHIC (%)

7: Median relative difference in geometric mean (%)

8: Median of geometric mean values across activity categories in SCOLA (mg/m³ except lead in µg/m³)

9: Median of geometric mean values across activity categories in COLCHIC (mg/m³ except lead in µg/m³)

10: Median absolute difference in proportion of records reported as non detected (%)

11: Median of proportion of records reported as non detected across activity categories in SCOLA (%)

12: Median of proportion of records reported as non detected across activity categories in COLCHIC (%)

Table V Comparison of exposure levels among selected chemical agents* in establishments common to COLCHIC and SCOLA over the period 2007 to 2012

Chemical agent	N ¹	COLCHIC		SCOLA		GM _{COLCHIC} /GM _{SCOLA}		
		n ²	n _{CS0} ³	n ²	n _{CS0} ³	Median ⁴	[C25-C75] ⁵	Range ⁶
Wood (dust)	48	520	9	959	9	1	[0.64 - 1.8]	[0.18 - 20]
Quartz	29	236	7	796	12	1,5	[0.97 - 3.1]	[0.06 - 25]
Cristobalite	28	235	7	775	13	4,1	[1.7 - 6.7]	[0.4 - 27]
Lead	19	234	10	542	12	1,9	[0.32 - 6.2]	[0.05 - 210]
Toluene	11	132	7	137	6	6,5	[0.83 - 23]	[0.012 - 78]
Xylene	6	74	8.5	58	3	3,8	[0.56 - 8]	[0.029 - 3200]
Acetone	5	87	12	38	4	0,38	[0.28 - 3300]	[0.033 - 3900]
Ethylbenzene	4	60	8.5	13	3	15	[9.1 - 26]	[1.6 - 47]
1-Methoxy-2-propyl acetate	3	70	8	20	5	1,1	[0.59 - 2]	[0.053 - 2.9]

*: Each chemical agent present in both databases in at least three common establishments (N≥3)

1: Number of establishments common to COLCHIC and SCOLA

2: Number of data points measured in the establishments

3: Median of the number of data points measured in an establishment

4: Median of the ratio of the geometric mean (GM)

5: Centile 25 and 75 of the ratio of the GM

6: Range of the ratio of the GM

Figure 1. Distribution of the number of samples in COLCHIC and SCOLA per year.

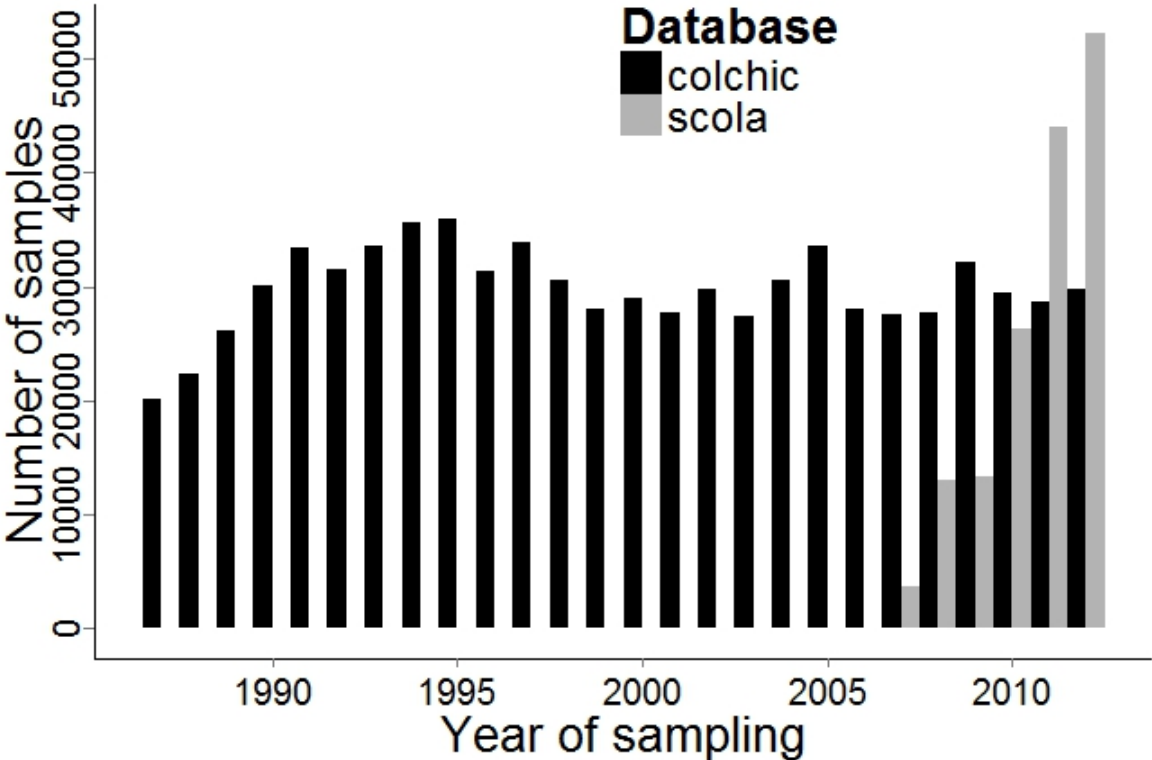
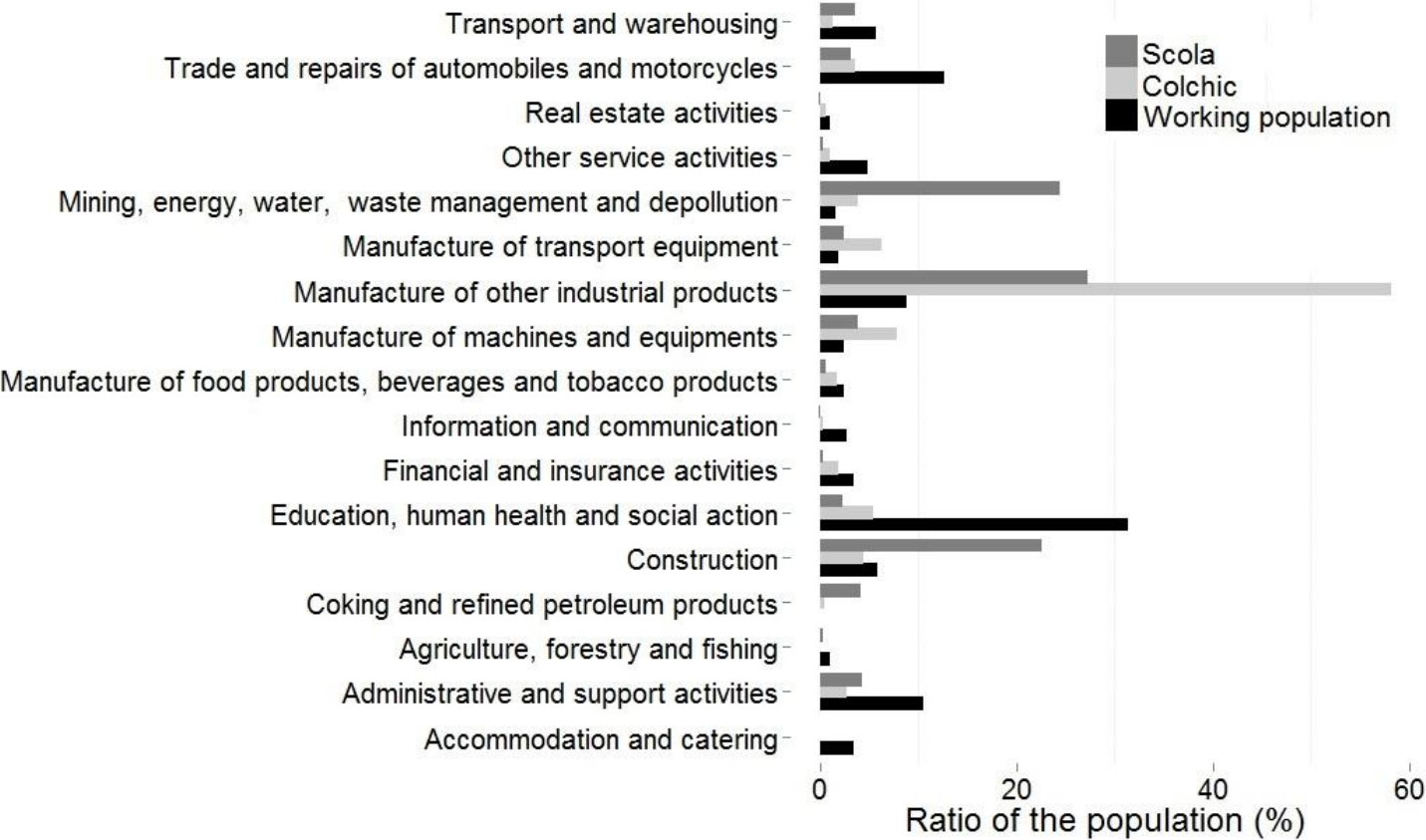
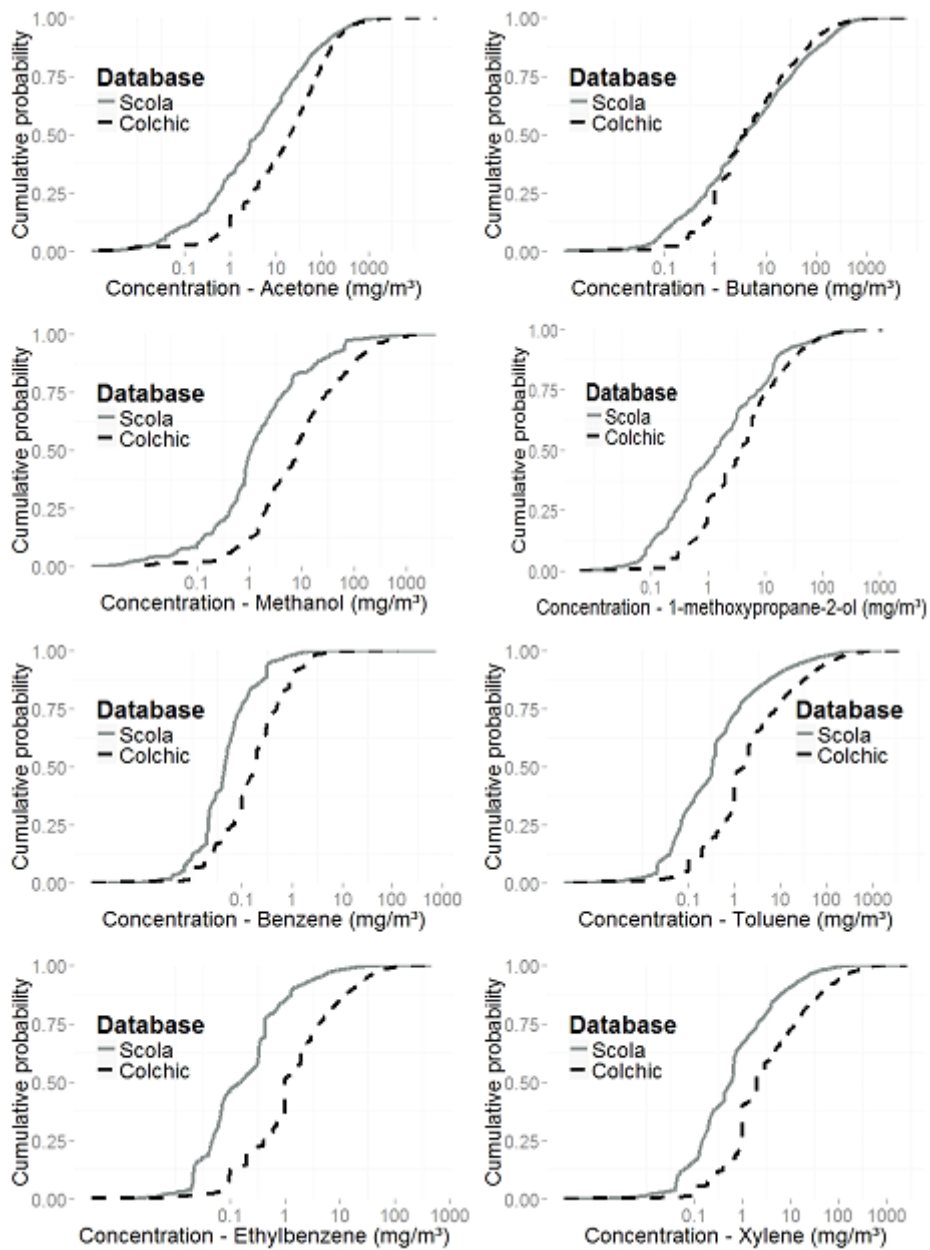
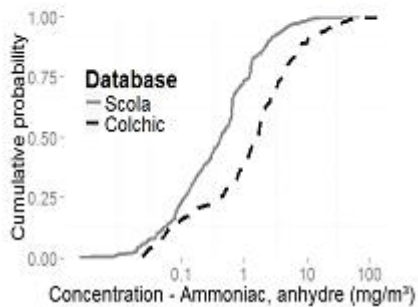
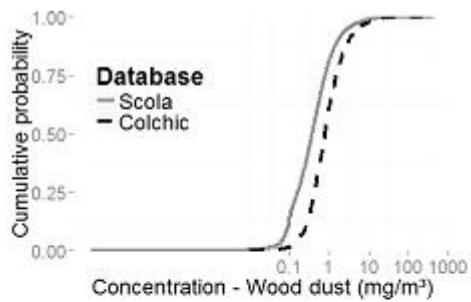
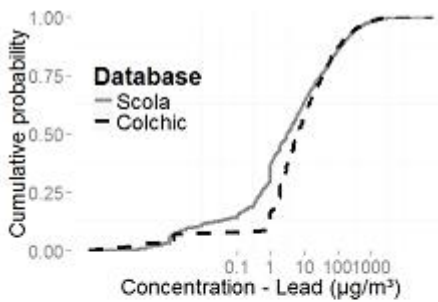
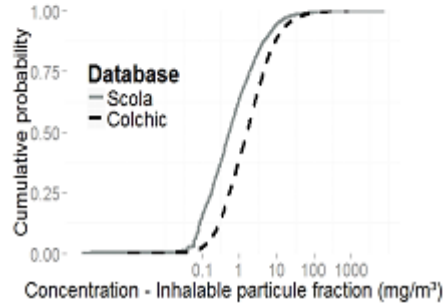
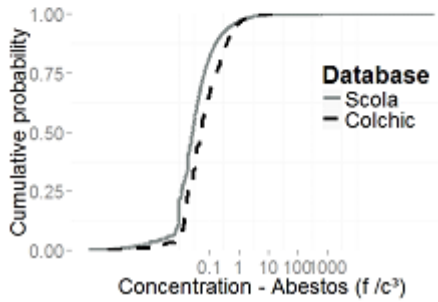
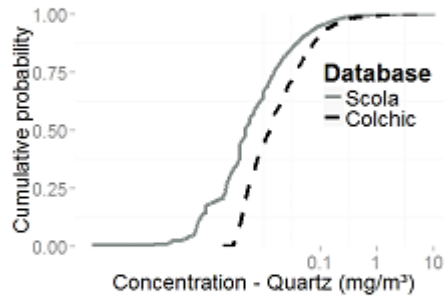
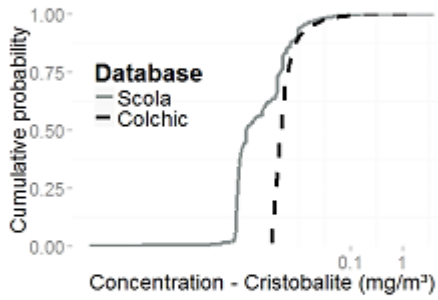
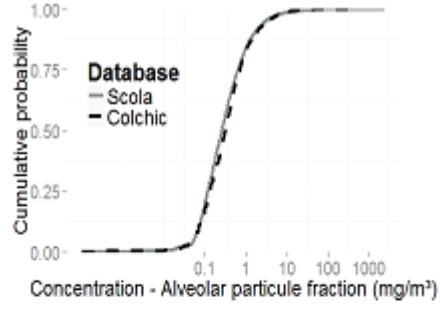
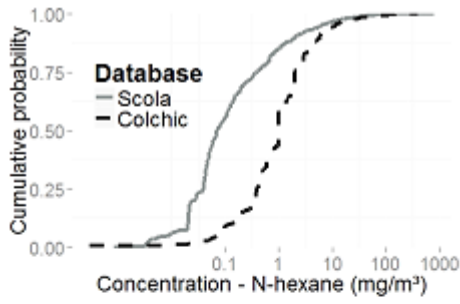


Figure 2. Proportion of the samples (%) in COLCHIC and SCOLA for industrial sectors and comparison with the population by industrial sector in 2012.



Appendix I. Measurement distribution curves by database for the period 2007–2012 part 1, part 2 and part 3.





Appendix II: Comparison of exposure levels in classes of activity common to COLCHIC and SCOLA over the period 2007 to 2012 restricted to the sample duration between 240 and 480 minutes

Industrial sector

Chemical agent	N ¹	% included SCOLA ²	% included COLCHIC ³	Exceedance			Geometric Mean			Non-detects		
				Bias ⁴	Median SCOLA ⁵	Median COLCHIC ⁶	Bias GM ⁷	Median GM SCOLA ⁸	Median GM COLCHIC ⁹	Bias ND ¹⁰	Median ND SCOLA ¹¹	Median ND COLCHIC ¹²
Lead	10	72	80	2.4	19	38	-151	0.46	0.82	18.9	9.2	0
Wood (dust)	15	87	96	21.3	8.7	12	48.3	1.8	5.5	-11.8	22	31

Occupation

Chemical agent	N ¹	% included SCOLA ²	% included COLCHIC ³	Exceedance			Geometric Mean			Non-detects		
				Bias ⁴	Median SCOLA ⁵	Median COLCHIC ⁶	Bias GM ⁷	Median GM SCOLA ⁸	Median GM COLCHIC ⁹	Bias ND ¹⁰	Median ND SCOLA ¹¹	Median ND COLCHIC ¹²
Cristobalite	16	50	72	0.38	1.2	0.23	-2,34	0.0012	0.0027	-0.18	94	94
Wood (dust)	11	71	94	7.22	24	33	37	0.47	0.79	-8.03	7.5	0.67
Quartz	16	49	71	5.22	4.5	9.2	33	0.006	0.013	-15.2	48	25

Task

Chemical agent	N ¹	% included SCOLA ²	% included COLCHIC ³	Exceedance			Geometric Mean			Non-detects		
				Bias ⁴	Median SCOLA ⁵	Median COLCHIC ⁶	Bias GM ⁷	Median GM SCOLA ⁸	Median GM COLCHIC ⁹	Bias ND ¹⁰	Median ND SCOLA ¹¹	Median ND COLCHIC ¹²
Cristobalite	16	32	44	0.39	0	0	-646	0.0008	0.0026	-4.92	95	94
Quartz	16	31	44	5.15	5.2	6.1	43.6	0.004	0.016	-19.2	48	31

1: number of classes categories in common with more than 20 measures in the two databases

2: Percentage of SCOLA records included in the comparison (%)

3: Percentage of COLCHIC records included in the comparison (%)

4: Median absolute difference in exceedance fraction of OELV (%)

5: Median of exceedance fraction of OELV across activity categories in SCOLA (%)

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7: Median relative difference in geometric mean (%)

8: Median of geometric mean values across activity categories in SCOLA (mg/m³ except lead in µg/m³)

9: Median of geometric mean values across activity categories in COLCHIC (mg/m³ except lead in µg/m³)

10: Median absolute difference in proportion of records reported as non detected (%)

11: Median of proportion of records reported as non detected across activity categories in SCOLA (%)

12: Median of proportion of records reported as non detected across activity categories in COLCHIC (%)