

Annexes

Annexe 1 : Bibliographie

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Annexe 2 : Tableau de l'évolution de l'IDH (indice de développement humain) de 1990 à 2014 et classement 2014 des pays à très haut et haut développement humain selon l'IDH (source : <http://hdr.undp.org/fr/composite/trends>)

L'Indice de Développement Humain est calculé sur la base de 3 dimensions : espérance de vie et santé, savoir et qualité de vie.

		Human Development Index (HDI)						
HDI rank	Country	Value						
		1990	2000	2010	2011	2012	2013	2014
VERY HIGH HUMAN DEVELOPMENT								
1	Norway	0.849	0.917	0.940	0.941	0.942	0.942	0.944
2	Australia	0.865	0.898	0.927	0.930	0.932	0.933	0.935
3	Switzerland	0.831	0.888	0.924	0.925	0.927	0.928	0.930
4	Denmark	0.799	0.862	0.908	0.920	0.921	0.923	0.923
5	Netherlands	0.829	0.877	0.909	0.919	0.920	0.920	0.922
6	Germany	0.801	0.855	0.906	0.911	0.915	0.915	0.916
6	Ireland	0.770	0.861	0.908	0.909	0.910	0.912	0.916
8	United States	0.859	0.883	0.909	0.911	0.912	0.913	0.915
9	Canada	0.849	0.867	0.903	0.909	0.910	0.912	0.913
9	New Zealand	0.820	0.874	0.905	0.907	0.909	0.911	0.913
11	Singapore	0.718	0.819	0.897	0.903	0.905	0.909	0.912
12	Hong Kong, China (SAR)	0.781	0.825	0.898	0.902	0.906	0.908	0.910
13	Liechtenstein	..	..	0.902	0.903	0.906	0.907	0.908
14	Sweden	0.815	0.897	0.901	0.903	0.904	0.905	0.907
14	United Kingdom	0.773	0.865	0.906	0.901	0.901	0.902	0.907
16	Iceland	0.802	0.859	0.892	0.896	0.897	0.899	0.899
17	Korea (Republic of)	0.731	0.821	0.886	0.891	0.893	0.895	0.898
18	Israel	0.785	0.850	0.883	0.888	0.890	0.893	0.894
19	Luxembourg	0.779	0.851	0.886	0.888	0.888	0.890	0.892
20	Japan	0.814	0.857	0.884	0.886	0.888	0.890	0.891
21	Belgium	0.806	0.874	0.883	0.886	0.889	0.888	0.890
22	France	0.779	0.848	0.881	0.884	0.886	0.887	0.888
23	Austria	0.794	0.836	0.879	0.881	0.884	0.884	0.885
24	Finland	0.783	0.857	0.878	0.881	0.882	0.882	0.883
25	Slovenia	0.766	0.824	0.876	0.877	0.878	0.878	0.880
26	Spain	0.756	0.827	0.867	0.870	0.874	0.874	0.876
27	Italy	0.766	0.829	0.869	0.873	0.872	0.873	0.873
28	Czech Republic	0.761	0.821	0.863	0.866	0.867	0.868	0.870
29	Greece	0.759	0.799	0.866	0.864	0.865	0.863	0.865
30	Estonia	0.726	0.780	0.838	0.849	0.855	0.859	0.861
31	Brunei Darussalam	0.782	0.819	0.843	0.847	0.852	0.852	0.856
32	Cyprus	0.733	0.800	0.848	0.852	0.852	0.850	0.850
32	Qatar	0.754	0.809	0.844	0.841	0.848	0.849	0.850
34	Andorra	..	..	0.823	0.821	0.844	0.844	0.845
35	Slovakia	0.738	0.763	0.827	0.832	0.836	0.839	0.844
36	Poland	0.713	0.786	0.829	0.833	0.838	0.840	0.843
37	Lithuania	0.730	0.754	0.827	0.831	0.833	0.837	0.839
37	Malta	0.729	0.766	0.824	0.822	0.830	0.837	0.839
39	Saudi Arabia	0.690	0.744	0.805	0.816	0.826	0.836	0.837
40	Argentina	0.705	0.762	0.811	0.818	0.831	0.833	0.836
41	United Arab Emirates	0.726	0.797	0.828	0.829	0.831	0.833	0.835
42	Chile	0.699	0.752	0.814	0.821	0.827	0.830	0.832
43	Portugal	0.710	0.782	0.819	0.825	0.827	0.828	0.830
44	Hungary	0.703	0.769	0.821	0.823	0.823	0.825	0.828
45	Bahrain	0.746	0.794	0.819	0.817	0.819	0.821	0.824
46	Latvia	0.692	0.727	0.811	0.812	0.813	0.816	0.819
47	Croatia	0.670	0.749	0.807	0.814	0.817	0.817	0.818
48	Kuwait	0.715	0.804	0.809	0.812	0.815	0.816	0.816
49	Montenegro	..	..	0.792	0.798	0.798	0.801	0.802

HIGH HUMAN DEVELOPMENT

50	Belarus	..	0.683	0.786	0.793	0.796	0.796	0.798
50	Russian Federation	0.729	0.717	0.783	0.790	0.795	0.797	0.798
52	Oman	..	..	0.795	0.793	0.793	0.792	0.793
52	Romania	0.703	0.706	0.784	0.786	0.788	0.791	0.793
52	Uruguay	0.692	0.742	0.780	0.784	0.788	0.790	0.793
55	Bahamas	..	0.778	0.774	0.778	0.783	0.786	0.790
56	Kazakhstan	0.690	0.679	0.766	0.772	0.778	0.785	0.788
57	Barbados	0.716	0.753	0.780	0.786	0.793	0.785	0.785
58	Antigua and Barbuda	..	..	0.782	0.778	0.781	0.781	0.783
59	Bulgaria	0.695	0.713	0.773	0.775	0.778	0.779	0.782
60	Palau	..	0.743	0.767	0.770	0.775	0.775	0.780
60	Panama	0.656	0.714	0.761	0.759	0.772	0.777	0.780
62	Malaysia	0.641	0.723	0.769	0.772	0.774	0.777	0.779
63	Mauritius	0.619	0.674	0.756	0.762	0.772	0.775	0.777
64	Seychelles	..	0.715	0.743	0.752	0.761	0.767	0.772
64	Trinidad and Tobago	0.673	0.717	0.772	0.767	0.769	0.771	0.772
66	Serbia	0.714	0.710	0.757	0.761	0.762	0.771	0.771
67	Cuba	0.675	0.685	0.778	0.776	0.772	0.768	0.769
67	Lebanon	..	..	0.756	0.761	0.761	0.768	0.769
69	Costa Rica	0.652	0.704	0.750	0.756	0.761	0.764	0.766
69	Iran (Islamic Republic of)	0.567	0.665	0.743	0.751	0.764	0.764	0.766
71	Venezuela (Bolivarian Republic of)	0.635	0.673	0.757	0.761	0.764	0.764	0.762
72	Turkey	0.576	0.653	0.738	0.751	0.756	0.759	0.761
73	Sri Lanka	0.620	0.679	0.738	0.743	0.749	0.752	0.757
74	Mexico	0.648	0.699	0.746	0.748	0.754	0.755	0.756
75	Brazil	0.608	0.683	0.737	0.742	0.746	0.752	0.755
76	Georgia	..	0.672	0.735	0.740	0.747	0.750	0.754
77	Saint Kitts and Nevis	..	..	0.739	0.741	0.743	0.747	0.752
78	Azerbaijan	..	0.640	0.741	0.742	0.745	0.749	0.751
79	Grenada	..	..	0.737	0.739	0.740	0.742	0.750
80	Jordan	0.623	0.705	0.743	0.743	0.746	0.748	0.748
81	The former Yugoslav Republic of Macedonia	..	..	0.738	0.742	0.743	0.744	0.747
81	Ukraine	0.705	0.668	0.732	0.738	0.743	0.746	0.747
83	Algeria	0.574	0.640	0.725	0.730	0.732	0.734	0.736
84	Peru	0.613	0.677	0.718	0.722	0.728	0.732	0.734
85	Albania	0.624	0.656	0.722	0.728	0.729	0.732	0.733
85	Armenia	0.632	0.648	0.721	0.723	0.728	0.731	0.733
85	Bosnia and Herzegovina	..	..	0.710	0.724	0.726	0.729	0.733
88	Ecuador	0.645	0.674	0.717	0.723	0.727	0.730	0.732
89	Saint Lucia	..	0.683	0.730	0.730	0.730	0.729	0.729
90	China	0.501	0.588	0.699	0.707	0.718	0.723	0.727
90	Fiji	0.631	0.678	0.717	0.720	0.722	0.724	0.727
90	Mongolia	0.578	0.589	0.695	0.706	0.714	0.722	0.727
93	Thailand	0.572	0.648	0.716	0.721	0.723	0.724	0.726
94	Dominica	..	0.694	0.723	0.723	0.723	0.723	0.724
94	Libya	0.679	0.731	0.756	0.711	0.745	0.738	0.724
96	Tunisia	0.567	0.654	0.714	0.715	0.719	0.720	0.721
97	Colombia	0.596	0.654	0.706	0.713	0.715	0.718	0.720
97	Saint Vincent and the Grenadines	..	0.674	0.711	0.713	0.715	0.717	0.720
99	Jamaica	0.671	0.700	0.727	0.727	0.723	0.717	0.719
100	Tonga	0.650	0.671	0.713	0.716	0.717	0.716	0.717
101	Belize	0.644	0.683	0.709	0.711	0.716	0.715	0.715
101	Dominican Republic	0.596	0.655	0.701	0.704	0.708	0.711	0.715
103	Suriname	..	..	0.707	0.709	0.711	0.713	0.714
104	Maldives	..	0.603	0.683	0.690	0.695	0.703	0.706
105	Samoa	0.621	0.649	0.696	0.698	0.700	0.701	0.702

Annexe 3

<i>Annexe 3 : détails des études associant les PM à des effets sur la santé respiratoire</i>	
(22) Mu, China, 2013	<p>Concentration PM1 en hiver (estimée sur le graphique) :</p> <ul style="list-style-type: none"> -personnes souffrant d'un cancer : 60-80$\mu\text{g}/\text{m}^3$ -contrôles : 10-20$\mu\text{g}/\text{m}^3$ <p>Concentrations de PM10, PM2.5 et PM1 beaucoup plus élevées en hiver chez les personnes souffrant de cancer que chez les contrôles, mais relation statistiquement significative ($p < 0.05$) uniquement pour les PM1</p> <p>Une augmentation de 10$\mu\text{g}/\text{m}^3$ de PM1 augmente le risque de cancer du poumon de 45% ($p < 0.01$)</p>
(37) Frey, USA, 2014	<p>Moyenne (médiane) PM10 chez les personnes</p> <ul style="list-style-type: none"> -souffrant d'emphysème oui/non : 154 (57)/56 (16) $\mu\text{g}/\text{m}^3$ (relation non-significative : $t = 1.5$, $p < 0.2$) -souffrant d'asthme oui/non : 98 (18)/61 (16) $\mu\text{g}/\text{m}^3$ (relation non-significative : $t = 0.7$, $p < 0.5$)
(39) Kaji, USA, 2014	<p>Médiane PM2.5 (IQR) intérieure au domicile des individus atopiques/non-atopiques souffrant de BPCO : 12.3 (4.7, 26.8)/9 (2.6, 29.3) $\mu\text{g}/\text{m}^3$</p> <p>Analyses multivariées : relations significatives uniquement chez les individus atopiques</p> <p>Une augmentation de 10$\mu\text{g}/\text{m}^3$ de PM2.5 est associée à</p> <ul style="list-style-type: none"> -un score MMRC (dyspnée) augmenté ($\beta = 0.23$, $p < 0.001$, 95% CI (0.09-0.34)) -plus de respiration sifflante (OR=2.49, $p = 0.02$, 95% CI (1.17-5.30)) -plus de symptômes nocturnes (OR=1.95, $p = 0.02$, 95% CI (1.09-3.48)) -plus d'exacerbations sévères (OR=2.12, $p = 0.03$, 95% CI (1.06-4.27)) -un score BCSS (dyspnée, toux, sputum) augmenté ($\beta = 0.44$, $p = 0.01$, 95% CI (0.69-4.41))
(41) Da Silva, Brazil, 2012	<p>PM2.5 pendant la cuisine ($\mu\text{g}/\text{m}^3$)</p> <ul style="list-style-type: none"> -biomasse intérieur : 230.3 +/-157.0 (n=16) -biomasse extérieur : 151.1 +/-114.8 (n=16) -gaz : 3.0 +/- 3.6 (n=16) <p>Les relations suivantes sont significatives chez les individus de plus de 20 ans</p> <p>Plus de :</p> <ul style="list-style-type: none"> -toux et sputum (OR=2.93 (95% CI 1.68-5.10)/OR=1.78 (95% CI 1.27-2.50)) -respiration sifflante (OR=2.33 (95% CI 1.25-4.38)/OR=1.78 (95% CI 1.18-2.69)) -dyspnée (OR=2.59 (95% CI 1.32-5.09)/OR=1.80 (95% CI 1.14-2.86)) <p>chez les personnes exposées au biomasse int/ext par rapport au gaz</p> <p>Chez les individus de moins de 20 ans, les relations ne sont significatives qu'en comparant l'exposition au biomasse intérieur et au gaz. Concernant l'exposition au biomasse extérieur, seule l'augmentation de la respiration sifflante est significative</p> <p>Les fonctions pulmonaires sont diminuées chez les individus non-fumeurs de plus de 20 ans exposés au biomasse par rapport à celles exposées au gaz ($p = 0.002$)</p>

(50) Hansel, USA, 2013	<p>Moyenne (+/-SD) PM2.5 dans le séjour de personnes souffrant de BPCO : 12.2 +/-12.2 µg/m³</p> <p>Une augmentation de 10 µg/m³ de PM2.5 dans le séjour de personnes souffrant de BPCO induit une augmentation de</p> <ul style="list-style-type: none"> -respiration sifflante (β=0.27, p=0.001, 95% CI 0.11-0.43) -utilisation de médication d'urgence (β=0.11, p=0.01, 95% CI 0.02-0.20) -symptômes nocturnes (β=1.44, p=0.01, 95% CI 1.08-1.93) -exacerbations sévères de BPCO (β=1.50, p=0.03, 95% CI 1.04-2.18)
(51) Lappalainen, Finland, 2013	<p>Moyenne géométrique PM>0.5 significativement plus élevée dans les bureaux des individus se plaignant de symptômes reliés au travail (symptômes/infections respiratoires hauts) par rapport aux individus ne s'en plaignant pas (p=0.007)</p> <ul style="list-style-type: none"> -individus se plaignant de symptômes/infections respiratoires : 2000 pt/l -individus ne se plaignant pas de symptômes/infections respiratoires : 1600 pt/l
(52) Weichenthal, Canada, 2013	<p>Moyenne PM10/PM2.5/PM1 au domicile significativement différente avec et sans l'utilisation d'un filtre à air (p<0.05)</p> <ul style="list-style-type: none"> -sans filtre : 69.8/61/54.6 µg/m³ -avec filtre : 38/30/25.9 µg/m³ <p>Une association significative entre l'utilisation d'un filtre à air et l'amélioration des fonctions pulmonaires des personnes exposées a été observée :</p> <ul style="list-style-type: none"> -FEV1 (β=217, 95% CI 23-410) -PEFR (β=607, 95% CI 4.7-1210)
(53) Jie, China, 2014	<p>PM2.5 intérieures pendant la cuisine significativement plus élevées au domicile des personnes exposées à la fumée de charbon (p<0.0001)</p> <ul style="list-style-type: none"> -groupe exposé à la fumée de charbon cuisine/séjour : 569.5/543.2 cpm (counts/min) -groupe non-exposé : 477/452.7 cpm (counts/min) <p>Fonctions pulmonaires (FVC, FEV1, FEV1/FVC, PEFR) diminuées chez les individus exposés à la fumée de charbon par rapport aux individus non-exposés (p<0.0001)</p>
(56) Balmes, USA, 2014	<p>PM2.5 au domicile d'individus souffrant d'asthme et de rhinite</p> <ul style="list-style-type: none"> -tertil moyen : 9.5-11.11µg/m³ -tertil supérieur : >11.11µg/m³ <p>Le tertiel supérieur des PM2.5 intérieures est associé à un FEV1 diminué chez les femmes (OR=2.23, 95% CI 1.08-4.61, p=0.03)</p> <p>Le tertiel moyen des PM2.5 intérieures est associé à plus de symptômes respiratoires chez les individus de moins de 55 ans (OR=2.07, 95% CI 1.01-4.24, p=0.05)</p>
(61) Logue, USA, 2012	<p>Estimation de l'incidence de bronchite chronique due aux PM2.5 (estimée sur le graphique) : 250/100'000 personnes/an pour une moyenne de PM2.5 intérieure de 15.9µg/m³</p>
(62) Vossoughi, GE, 2014	<p>Modèle d'exposition estimée</p> <ul style="list-style-type: none"> -médianes (IQR) PM10/PM2.5 intérieures : 26.4 (2.26)/17.4 (2.06) µg/m³ <p>Une augmentation de 2.06 µg/m³ (=1 IQR) de PM2.5 est associée à une augmentation de 16% des dérivés de NO, de 25% des LTB4 et de 15% de TNFα dans le sputum (pourcentages estimés sur le graphique)</p> <p>Une augmentation de 2.26 µg/m³ (=1 IQR) de PM10 a été associée à une augmentation de 16% de LTB4 dans le sputum (pourcentage estimé sur le</p>

	graphique) <i>Étude effectuée uniquement avec des femmes</i>
(63) Hoppe, USA, 2012	Moyennes géométriques iPM significativement plus élevée dans les domiciles en rénovation qu'après rénovation (p=0.012) -domiciles en rénovation : 78 µg/m ³ -domiciles après rénovation : 34 µg/m ³ Les habitants des domiciles ayant subi une inondation ont rapporté significativement plus de respiration sifflante après l'inondation qu'avant (OR=3.77, 95% CI 2.06-6.92, p<0.001) et plus d'allergies durant les rénovations qu'après (OR=3.08, 95% CI 1.05-9.02)
(65) Bentayeb, EU, 2015	Des concentrations de PM0.1 élevées (>11'000pt/cm ³ =médiane estimée sur le graphique) ont été associées à plus de respiration sifflante (OR=2.82, 95% CI 1.15-7.02, p=0.023) et à un rapport FEV1/FVC inférieur à 70% (OR=8.16, 95% CI 2.24-29.3, p=0.001) Des concentrations de PM10 élevées (>25µg/m ³ =médiane estimée sur le graphique) ont été associées à plus de dyspnée (OR=1.53, 95% CI 1.15-2.07, p=0.003) et plus de toux (OR=1.73, 95% CI 1.20-2.50, p=0.002)
(69) Bakke, Norway, 2012	Moyenne PM10 : 15µg/m ³ Une association a été montrée entre la concentration de PM10 et des symptômes de rhinite, gorge sèche/enrouée et toux parmi les personnes souffrant d'eczéma. Malheureusement, la seule concentration de PM citée dans l'article est la moyenne.
(70) Rylance, EN, 2015	<i>Étude effectuée in vitro</i> <i>Ni la taille, ni la concentration des PM n'est mentionnée</i>
(71) Taner, Turkey, 2013	<i>Risque cancérigène calculé par rapport à la composition des PM2.5 produites par la combustion de charbon dans la cuisine des restaurants</i> <i>Les concentrations en PM2.5 ne sont pas mentionnées</i>