

Analysis of Concordance

Supplemental Material I: Database of Anatomically-based Tumour Sites in Animals and Humans

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in the Workshop on Tumour Site Concordance and Mechanisms of Carcinogenesis,
which was convened by IARC in April and November 2012 in Lyon

Krewski et al. (2018) conducted a comprehensive analysis of the concordance between tumours seen in animals and humans for 111 distinct Group-1 agents identified in the IARC Monographs programme through Volume 109, based on information abstracted from the IARC Monographs by Grosse et al. (2018). The format of data abstracted from the Monographs by Grosse et al. (2018) is illustrated in Table 3 of Krewski et al. (2018), which includes histological information on animal and human tumours associated with these 111 agents, as well as information on the route of exposure and the gender and species of experimental animal models used.

Because there currently exists no common tumour nomenclature for animal and human tumours, Krewski et al. (2018, Table 2) developed an anatomically-based tumour nomenclature system that permits comparison of tumours seen in animals and humans on a site-specific basis, as well as on the basis of organ and tissue systems comprised of anatomically-related tumour sites. This system was developed by first identifying the anatomical tumour sites seen in both animals and humans for the 111 Group-1 agents based on the data abstracted from the Monographs by Grosse et al. (2018), as summarized in Supplemental Table 1. This was done by recording the individual tumour sites seen in humans and animals in columns 3 and 4 in Supplemental Table 1, respectively, organized by the organ and tissue systems in column 1; column 2 provides the common anatomically-based tumour site used for both animal and human tumours occurring at this site. It should be noted that although *sufficient evidence* for sites in italics in Supplementary Table 1 was not available in either animals or humans for any of the 111 Group-1 agents, these sites are included to record that they were considered, but not observed for various reasons noted in the footnotes to Supplementary Table 1, including the possibility that only *limited evidence* of carcinogenicity was available. This analysis formed the basis for the harmonized, anatomically-based tumour nomenclature system used by Krewski et al. (2018) as the basis for evaluating concordance between animal and human tumours.

The IARC tumour site concordance database based on this anatomically-based tumour nomenclature system (Supplemental Table 2). A data dictionary describing the elements of Supplemental Table 2 is provided in Supplemental Table 3. Supplemental Table 4 provides the numerical codes assigned to the 47 individual tumour sites and 13 organ and tissue systems included in the database.

Distributions of tumours expressed by across the tumour sites listed in Supplemental Table 4 for humans, (all) animals, mice, and rats are shown in Supplemental Figures 1-4, respectively, by type of agent. [Although there are 47 tumour sites listed in Supplemental Table 4, the 111 Group-1 agents considered

here demonstrated animal and/or human tumours at only 39 of these 47 sites.] Similar results for the 15 organ and tissue systems are shown in Supplemental Figures 5-8.

The 60 Group-1 agents included in the analysis of concordance between animal and human tumours reported by Krewski et al. (2018) are summarized in Supplemental Table 5. Concordance analysis was necessarily restricted to these 60 agents because of the requirement of sufficient evidence of at least one tumour site in animals and sufficient evidence of at least one tumour site in humans.

References

Grosse, Y., Lajoie, P., Billard, M., Krewski, D., Rice, J.R., Coglianò, V., Straif, K., Bird, M. & Zielinski, J.M. (2018). Database of animal and human tumours based on 111 distinct Group-1 agents known to cause cancer in humans. [This volume.]

Krewski, D., Rice, J.M., Bird, M., Milton, B., Collins, B., Lajoie, P., Billard, M., Grosse, Y., Baan, R., Coglianò, V., Straif, K., Caldwell, J., Rusyn, I.I., Portier, C.J., Melnick, R., Little, J. & Zielinski, J.M., in collaboration with other participants in the IARC Workshop on 'Tumour-site Concordance and Mechanisms of Carcinogenesis' which convened in Lyon, April/November 2012 (2016). Concordance between sites of tumour development in humans and in experimental animals for 111 agents that are carcinogenic to humans. [This volume.]

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Supplemental Table 1. Animal and Human Tumour Sites for 111 Group-1 Agents Identified through Volume 109 of the IARC Monographsⁱ

Organ and Tissue System	Tumour Site	Sites with <i>Sufficient Evidence</i> for Cancer in Humans	Sites with <i>Sufficient Evidence</i> for Cancer in Experimental Animals
Upper aerodigestive tract	Nasal cavity and paranasal sinuses Nasopharynx Oral cavity Pharynx Tongue Tonsil Salivary gland	Nasal cavity and paranasal sinuses Nasopharynx Oral cavity Pharynx (incl. oropharynx & hypopharynx) Tonsil Salivary gland	Nasal cavity Oral cavity Lip (inner) ⁱⁱ Tongue
Respiratory system	<i>Trachea</i> ⁱⁱⁱ Larynx Lung Lower respiratory tract	<i>Trachea</i> Larynx Lung	<i>Trachea</i> Larynx Lung Lower respiratory tract (larynx, trachea, and lung)
Mesothelium	Mesothelium	Mesothelium	Pleural mesothelium Peritoneal mesothelium <i>Peritesticular mesothelium</i>
Digestive tract	Digestive tract (unspecified) Oesophagus Stomach Intestine, including colon and rectum	Digestive tract (unspecified) Oesophagus Stomach Colon and rectum	Oesophagus Forestomach Glandular stomach Small and/or large intestine
Digestive organs	Liver parenchyma and bile ducts Pancreas NOS Gall bladder	Liver (parenchyma) and bile ducts Gall bladder Pancreas NOS	Liver parenchyma <i>Bile ducts</i> <i>Gall bladder</i> ^{iv} <i>Pancreas, exocrine</i>
Nervous system and eye	Brain and spinal cord (CNS) <i>Cranial and peripheral nerves</i> ^v Eye	Brain and spinal cord (CNS) <i>Cranial and peripheral nerves</i> Eye (melanoma)	Brain and spinal cord (CNS) <i>Cranial and spinal nerves</i>
Endocrine system	Thyroid, follicular epithelium	Thyroid	Thyroid, follicular epithelium

	Adrenal gland (medulla, cortex, NOS) Pituitary		Adrenal gland (medulla, cortex, NOS) Pituitary
Kidney	Kidney (renal cell carcinoma)	Kidney, unspecified	Kidney, unspecified
Urothelium	Urothelium (renal pelvis, ureter, urinary bladder)	Renal pelvis Ureter Urinary bladder	Renal pelvis Ureter Urinary bladder
Lymphoid and haematopoietic tissues	Haematopoietic tissue Lymphoid tissue	Haematopoietic tissue (AML, ANLL) ^{vi} Leukaemia, unspecified Lymphoid tissue (lymphoid leukaemia/lymphoma)	Haematopoietic tissue (granulocytic leukaemia) Lymphoid tissue including thymus (leukaemia/ lymphoma)
Skin	Skin and adnexae Cutaneous melanocytes	Skin and adnexae (general body surface including scrotum, penis, anus and conjunctivae) <i>Lip (outer)</i> ^{vii} Cutaneous melanocytes (malignant melanoma)	Skin and cutaneous sebaceous glands
Connective tissues	Soft connective tissue Blood vasculature (endothelium) Hard connective tissue (bone, cartilage)	Soft connective tissue Blood vasculature (endothelium) Angiosarcoma of the liver Hard connective tissue (bone, cartilage)	Soft connective tissue (incl. haemangiosarcoma) Hard connective tissue (bone, cartilage)
Female breast, female reproductive organs and reproductive tract	Breast Ovary Uterus Uterine cervix Vulva/vagina	Breast Ovary Uterus NOS Endometrium Uterine cervix Vulva/vagina	Mammary gland Ovary Uterus NOS
Male reproductive system ^{viii}	<i>Testis, germ cells</i> <i>Testis, specialized gonadal stroma</i>	<i>Testis, germ cells</i> <i>Testis, specialized gonadal stroma</i>	<i>Testis, specialized gonadal stroma (Leydig cells)</i>

	<i>Prostate</i>	<i>Prostate</i>	<i>Prostate</i>
Other groupings (not included in the concordance analysis)	All cancers combined All solid cancers <i>Solid cancers, aside from lung</i> <i>Multiple or unspecified sites</i> Exocrine glands NOS	All cancers combined All solid cancers <i>Solid cancers aside from lung</i> <i>Multiple or unspecified sites</i> <i>Exocrine glands NOS</i>	Non-digestive exocrine glands (including Harderian gland, Zymbal gland [ear duct], preputial gland)

ⁱ Although sites in italics were not in the concordance developed by Grosse et al. (2015) , they are included in the anatomically-based tumour taxonomy system for completeness.

ⁱⁱ The monographs do not distinguish between inner and outer lip; this was inferred to be lip inner because of the Group-1 agent it relates to ‘smokeless tobacco’

ⁱⁱⁱ Trachea was not found as a distinct site in the concordance database.

^{iv} The rat has no gall bladder

^v Cranial and peripheral nerves were not found as a distinct site in the current database.

^{vi} AML: Acute myeloid leukemia; ANLL: Acute non-lymphocytic leukemia.

^{vii} Lip (outer) provided only *limited evidence* in humans for solar radiation.

^{viii} The male reproductive system provided on *limited evidence* in humans (in all three listed tumour sites).

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data ^a	Mechanistic Upgrade	Human Tumour Site Specified
A	1	Aristolochic acid	Rat	Forestomach	Stomach	Stomach	15	Digestive tract	4	1		1	0
A	1	Aristolochic acid	Rat	Renal pelvis	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		1	0
A	1	Aristolochic acid	Human	Not specified						1		1	0
A	2	Aristolochic acid, plants containing	Rat	Forestomach	Stomach	Stomach	15	Digestive tract	4	1		0	1
A	2	Aristolochic acid, plants containing	Human	Renal pelvis	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
A	2	Aristolochic acid, plants containing	Rat	Renal pelvis	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
A	2	Aristolochic acid, plants containing	Human	Ureter	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
A	3	Azathioprine	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
A	3	Azathioprine	Human	Non-Hodgkin lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
A	3	Azathioprine	Mouse	Thymus	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
A	3	Azathioprine	Human	Skin (squamous cell carcinoma)	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
A	4	Busulfan	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	6	0	1
A	5	Chlorambucil	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
A	5	Chlorambucil	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
A	6	Chlornaphazine	Human	Bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	6	0	1
A	7	Cyclophosphamide	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
A	7	Cyclophosphamide	Human	Bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
A	7	Cyclophosphamide	Rat	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
A	7	Cyclophosphamide	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
A	7	Cyclophosphamide	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
A	7	Cyclophosphamide	Mouse	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	8	Ciclosporine	Human	Non-Hodgkin lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	6	0	1
A	8	Ciclosporine	Human	Squamous cell carcinoma	Skin and adnexae	Skin and adnexae	30	Skin	11	0	6	0	1
A	9	Diethylstilbestrol	Hamster	Kidney	Kidney	Kidney	26	Kidney	8	1		0	1
A	9	Diethylstilbestrol	Human	Breast (exposure while pregnant)	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	9	Diethylstilbestrol	Human	Cervix (clear cell adenocarcinoma, exposure in utero)	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	9	Diethylstilbestrol	Mouse	Uterine cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	9	Diethylstilbestrol	Mouse	Uterus	Uterus	Uterus	38	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	9	Diethylstilbestrol	Human	Vagina (clear cell adenocarcinoma, exposure in utero)	Vulva/vagina	Vulva/vagina	39	Female breast, female reproductive organs and reproductive tract	13	1		0	1

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A	10	Estrogen-only menopausal therapy	Hamster	Kidney	Kidney	Kidney	26	Kidney	8	1		0	1
A	10	Estrogen-only menopausal therapy	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
A	10	Estrogen-only menopausal therapy	Mouse	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	10	Estrogen-only menopausal therapy	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	10	Estrogen-only menopausal therapy	Human	Ovary	Ovary	Ovary	36	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	10	Estrogen-only menopausal therapy	Mouse	Uterine cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	10	Estrogen-only menopausal therapy	Human	Endometrium	Uterus	Uterus	38	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	10	Estrogen-only menopausal therapy	Mouse	Uterus	Uterus	Uterus	38	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	11	Estrogen-progestogen menopausal therapy (combined)	Human	Breast	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	0	6	0	1
A	11	Estrogen-progestogen menopausal therapy (combined)	Human	Endometrium (increased risk for estrogen-induced endometrial cancer decreases with the number of days per month that progestogens are used)	Uterus	Uterus	38	Female breast, female reproductive organs and reproductive tract	13	0	6	0	1
A	12	Estrogen-progestogen oral contraceptives (combined)	Human	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
A	12	Estrogen-progestogen oral contraceptives (combined)	Human	Breast	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	12	Estrogen-progestogen oral contraceptives (combined)	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	12	Estrogen-progestogen oral contraceptives (combined)	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	13	Etoposide	Human	Not specified						0	4	1	0
A	14	Etoposide in combination with cisplatin and bleomycin	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	2	0	1
A	15	Melphalan	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	7	0	1
A	16	Methoxsalen in combination with UVA	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
A	16	Methoxsalen in combination with UVA	Human	Skin (squamous cell carcinoma)	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
A	17	MOPP and other combined chemotherapy including alkylating agents	Human	Lung	Lung	Lung	10	Respiratory system	2	0	2	0	1
A	17	MOPP and other combined chemotherapy including alkylating agents	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	2	0	1
A	18	Phenacetin	Mouse	Kidney	Kidney	Kidney	26	Kidney	8	1		1	1
A	18	Phenacetin	Rat	Kidney	Kidney	Kidney	26	Kidney	8	1		1	1
A	18	Phenacetin	Human	Renal pelvis	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		1	1
A	18	Phenacetin	Rat	Renal pelvis	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		1	1

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A	18	Phenacetin	Human	Ureter	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		1	1
A	19	Phenacetin, analgesic mixtures containing	Human	Renal pelvis	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	6	0	1
A	19	Phenacetin, analgesic mixtures containing	Human	Ureter	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	6	0	1
A	20	1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU)	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	6	0	1
A	21	Tamoxifen	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
A	21	Tamoxifen	Human	Endometrium	Uterus	Uterus	38	Female breast, female reproductive organs and reproductive tract	13	1		0	1
A	22	Thiotepa	Human	Leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
A	22	Thiotepa	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
A	23	Treosulfan	Human	Acute myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	5	0	1
B	24	Clonorchis sinensis (infection with)	Human	Cholangiocarcinoma	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	0	6	0	1
B	25	Epstein-Barr virus	Human	Nasopharyngeal carcinoma	Nasopharynx	Nasopharynx	2	Upper aerodigestive tract	1	0	3	0	1
B	25	Epstein-Barr virus	Human	Hodgkin lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	25	Epstein-Barr virus	Human	Immune-suppression-related non-Hodgkin lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	25	Epstein-Barr virus	Human	Burkitt lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	25	Epstein-Barr virus	Human	Estranodal NK/T-cell lymphoma (nasal type)	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	26	Helicobacter pylori (infection with)	Mouse	Glandular stomach	Stomach	Stomach	15	Digestive tract	4	1		0	1
B	26	Helicobacter pylori (infection with)	Human	Non-cardiac gastric carcinoma	Stomach	Stomach	15	Digestive tract	4	1		0	1
B	26	Helicobacter pylori (infection with)	Human	Low-grade B-cell MALT gastric lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
B	27	Hepatitis B virus	Human	Hepatocellular carcinoma	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	0	3	0	1
B	28	Hepatitis C virus	Human	Hepatocellular carcinoma	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	0	3	0	1
B	28	Hepatitis C virus	Human	Non-Hodgkin lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	29	Human immunodeficiency virus type 1	Human	Hodgkin lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	29	Human immunodeficiency virus type 1	Human	Non-Hodgkin lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	29	Human immunodeficiency virus type 1	Human	Anus	Skin and adnexae	Skin and adnexae	30	Skin	11	0	3	0	1
B	29	Human immunodeficiency virus type 1	Human	Conjunctiva	Skin and adnexae	Skin and adnexae	30	Skin	11	0	3	0	1
B	29	Human immunodeficiency virus type 1	Human	Kaposi sarcoma	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	0	3	0	1
B	29	Human immunodeficiency virus type 1	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 16	Human	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	0	3	0	1
B	30	Human papillomavirus type 16	Human	Oropharynx	Pharynx	Pharynx	4	Upper aerodigestive tract	1	0	3	0	1
B	30	Human papillomavirus type 16	Human	Tonsil	Tonsil	Tonsil	6	Upper aerodigestive tract	1	0	3	0	1
B	30	Human papillomavirus type 16	Human	Anus	Skin and adnexae	Skin and adnexae	30	Skin	11	0	3	0	1
B	30	Human papillomavirus type 16	Human	Penis	Skin and adnexae	Skin and adnexae	30	Skin	11	0	3	0	1

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B	30	Human papillomavirus type 16	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 18	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 31	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 33	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 35	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 39	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 45	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 51	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 52	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 56	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 58	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 59	Human	Cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 16	Human	Vagina	Vulva/vagina	Vulva/vagina	39	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	30	Human papillomavirus type 16	Human	Vulva	Vulva/vagina	Vulva/vagina	39	Female breast, female reproductive organs and reproductive tract	13	0	3	0	1
B	31	Human T-cell lymphotropic virus type 1	Human	Adult T-cell leukaemia/lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	32	Kaposi sarcoma herpesvirus	Human	Primary effusion lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	3	0	1
B	32	Kaposi sarcoma herpesvirus	Human	Kaposi sarcoma	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	0	3	0	1
B	33	Oposthorchis viverrini (infection with)	Human	Cholangiocarcinoma	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	0	6	0	1
B	34	Schistosoma haematobium (infection with)	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	6	0	1
C	35	Arsenic and inorganic arsenic compounds	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	35	Arsenic and inorganic arsenic compounds	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	35	Arsenic and inorganic arsenic compounds	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
C	35	Arsenic and inorganic arsenic compounds	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
C	35	Arsenic and inorganic arsenic compounds	Rat	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
C	35	Arsenic and inorganic arsenic compounds	Human	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Human	Larynx	Larynx	Larynx	9	Respiratory system	2	1		0	1
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Human	Mesothelioma	Mesothelium	Mesothelium	12	Mesothelium	3	1		0	1
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Baboon	Mesothelium	Mesothelium	Mesothelium	12	Mesothelium	3	1		0	1
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Hamster	Mesothelium	Mesothelium	Mesothelium	12	Mesothelium	3	1		0	1
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Rat	Mesothelium	Mesothelium	Mesothelium	12	Mesothelium	3	1		0	1
C	36	Asbestos (all forms, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite)	Human	Ovary	Ovary	Ovary	36	Female breast, female reproductive organs and reproductive tract	13	1		0	1
C	37	Beryllium and beryllium compounds	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	37	Beryllium and beryllium compounds	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	38	Cadmium and cadmium compounds	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	38	Cadmium and cadmium compounds	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	38	Cadmium and cadmium compounds	Rat	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
C	39	Chromium (VI) compounds	Rat	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
C	39	Chromium (VI) compounds	Rat	Tongue	Tongue	Tongue	5	Upper aerodigestive tract	1	1		0	1
C	39	Chromium (VI) compounds	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	39	Chromium (VI) compounds	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	39	Chromium (VI) compounds	Mouse	Ileum	Intestine, including colon and rectum	Intestine	16	Digestive tract	4	1		0	1
C	39	Chromium (VI) compounds	Mouse	Jejunum	Intestine, including colon and rectum	Intestine	16	Digestive tract	4	1		0	1
C	39	Chromium (VI) compounds	Mouse	Small intestine	Intestine, including colon and rectum	Intestine	16	Digestive tract	4	1		0	1
C	39	Chromium (VI) compounds	Mouse	Duodenum	Intestine, including colon and rectum	Intestine	16	Digestive tract	4	1		0	1
C	39	Chromium (VI) compounds	Rat	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
C	40	Erionite	Human	Mesothelioma	Mesothelium	Mesothelium	12	Mesothelium	3	1		0	1
C	40	Erionite	Rat	Mesothelium	Mesothelium	Mesothelium	12	Mesothelium	3	1		0	1
C	41	Leather dust	Human	Nasal sinus	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	0	5	0	1
C	42	Nickel compounds	Human	Nasal cavity and paranasal sinuses	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
C	42	Nickel compounds	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	42	Nickel compounds	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	42	Nickel compounds	Rat	Adrenal medulla	Adrenal gland	Adrenal gland	24	Endocrine system	7	1		0	1
C	42	Nickel compounds	Hamster	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
C	42	Nickel compounds	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
C	42	Nickel compounds	Rat	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
C	43	Silica dust, crystalline, in the form of quartz or cristobalite	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	43	Silica dust, crystalline, in the form of quartz or cristobalite	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
C	43	Silica dust, crystalline, in the form of quartz or cristobalite	Rat	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
C	44	Wood dust	Human	Nasal sinus	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	0	4	0	1
C	44	Wood dust	Human	Nasopharynx	Nasopharynx	Nasopharynx	2	Upper aerodigestive tract	1	0	4	0	1
D	45	Fission products including Sr-90	Human	Leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
D	45	Fission products including Sr-90	Dog	Bone	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	45	Fission products including Sr-90	Mouse	Bone	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	45	Fission products including Sr-90	Human	Solid cancers	All solid cancers	All solid cancers	44	Other groupings	15	1		0	1
D	46	Haematite mining with exposure to radon (underground)	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	46	Haematite mining with exposure to radon (underground)	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	47	Ionizing radiation (all types)	Human	Not specified						1		0	0
D	48	Neutron radiation	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
D	48	Neutron radiation	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
D	48	Neutron radiation	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		1	0
D	48	Neutron radiation	Mouse	Adrenal gland	Adrenal gland	Adrenal gland	24	Endocrine system	7	1		1	0
D	48	Neutron radiation	Mouse	Pituitary gland	Pituitary	Pituitary	25	Endocrine system	7	1		1	0
D	48	Neutron radiation	Monkey (Rhesus)	Kidney	Kidney	Kidney	26	Kidney	8	1		1	0
D	48	Neutron radiation	Mouse	Haematopoietic tissue	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		1	0
D	48	Neutron radiation	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		1	0
D	48	Neutron radiation	Mouse	Thymus	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		1	0
D	48	Neutron radiation	Mouse	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		1	0
D	48	Neutron radiation	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		1	0
D	48	Neutron radiation	Mouse	Ovary	Ovary	Ovary	36	Female breast, female reproductive organs and reproductive tract	13	1		1	0
D	48	Neutron radiation	Mouse	Harderian gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		1	0
D	48	Neutron radiation	Human	Not specified						1		1	0
D	49	P-32, as phosphate	Human	Leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	7	0	1
D	50	Pu-239	Dog	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	50	Pu-239	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	50	Pu-239	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	50	Pu-239	Dog	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
D	50	Pu-239	Human	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
D	50	Pu-239	Human	Bone	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	50	Pu-239	Dog	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	50	Pu-239	Mouse	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data ^a	Mechanistic Upgrade	Human Tumour Site Specified
D	50	Pu-239	Rat	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	51	Radioiodines, including I-131	Human	Thyroid	Thyroid	Thyroid	23	Endocrine system	7	1		0	1
D	51	Radioiodines, including I-131	Mouse	Thyroid	Thyroid	Thyroid	23	Endocrine system	7	1		0	1
D	51	Radioiodines, including I-131	Rat	Thyroid	Thyroid	Thyroid	23	Endocrine system	7	1		0	1
D	52	Internalized radionuclides that emit alpha particles	Human	Not specified						1		0	0
D	52	Internalized radionuclides that emit alpha particles	Dog	Lung	Lung	Lung	10	Respiratory system	2	1		0	0
D	52	Internalized radionuclides that emit alpha particles	Hamster	Lung	Lung	Lung	10	Respiratory system	2	1		0	0
D	52	Internalized radionuclides that emit alpha particles	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	0
D	52	Internalized radionuclides that emit alpha particles	Dog	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	0
D	52	Internalized radionuclides that emit alpha particles	Mouse	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	0
D	52	Internalized radionuclides that emit alpha particles	Rat	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	0
D	53	Internalized radionuclides that emit beta particles	Human	Not specified						1		0	0
D	53	Internalized radionuclides that emit beta particles	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	0
D	53	Internalized radionuclides that emit beta particles	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	0
D	53	Internalized radionuclides that emit beta particles	Mouse	Thymus	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	0
D	53	Internalized radionuclides that emit beta particles	Dog	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	0
D	53	Internalized radionuclides that emit beta particles	Rat	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	0
D	53	Internalized radionuclides that emit beta particles	Dog	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	0
D	53	Internalized radionuclides that emit beta particles	Mouse	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	0
D	53	Internalized radionuclides that emit beta particles	Rat	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	0
D	53	Internalized radionuclides that emit beta particles	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	0
D	54	Ra-224 and its decay products	Human	Bone	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	54	Ra-224 and its decay products	Dog	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	54	Ra-224 and its decay products	Mouse	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	55	Ra-226 and its decay products	Human	Paranasal sinus	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
D	55	Ra-226 and its decay products	Human	Bone	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	55	Ra-226 and its decay products	Human	Mastoid process	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	55	Ra-226 and its decay products	Dog	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	55	Ra-226 and its decay products	Mouse	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	56	Ra-228 and its decay products	Human	Bone	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	56	Ra-228 and its decay products	Dog	Skeletal system	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	57	Rn-222 and its decay products	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	57	Rn-222 and its decay products	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	58	Solar radiation	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
D	58	Solar radiation	Rat	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
D	58	Solar radiation	Human	Skin (basal cell carcinoma, squamous cell carcinoma)	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
D	58	Solar radiation	Human	Skin (malignant melanoma)	Cutaneous melanocytes	Cutaneous melanocytes	31	Skin	11	1		0	1
D	59	Th-232 (as Thorotrast)	Human	Extrahepatic bile ducts	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
D	59	Th-232 (as Thorotrast)	Hamster	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
D	59	Th-232 (as Thorotrast)	Human	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
D	59	Th-232 (as Thorotrast)	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
D	59	Th-232 (as Thorotrast)	Human	Gall bladder	Gall bladder	Gall bladder	19	Digestive organs	5	1		0	1
D	59	Th-232 (as Thorotrast)	Human	Leukaemia (excluding chronic lymphocytic leukaemia)	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
D	60	UV radiation (bandwidth 100-400 nm, encompassing UVC, UVB and UVA)	Human	Not specified						1		0	0
D	60	UV radiation (bandwidth 100-400 nm, encompassing UVC, UVB and UVA)	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	0
D	60	UV radiation (bandwidth 100-400 nm, encompassing UVC, UVB and UVA)	Rat	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	0
D	61	UV-emitting tanning devices	Human	Eye (melanoma)	Eye	Eye	22	Nervous system and eye	6	1		0	1
D	61	UV-emitting tanning devices	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
D	61	UV-emitting tanning devices	Human	Skin (melanoma)	Cutaneous melanocytes	Cutaneous melanocytes	31	Skin	11	1		0	1
D	62	X- and Gamma radiation	Human	Salivary gland	Salivary gland	Salivary gland	7	Upper aerodigestive tract	1	1		0	1
D	62	X- and Gamma radiation	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	62	X- and Gamma radiation	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
D	62	X- and Gamma radiation	Human	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	1		0	1
D	62	X- and Gamma radiation	Human	Stomach	Stomach	Stomach	15	Digestive tract	4	1		0	1
D	62	X- and Gamma radiation	Human	Colon	Intestine, including colon and rectum	Intestine	16	Digestive tract	4	1		0	1
D	62	X- and Gamma radiation	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
D	62	X- and Gamma radiation	Human	Brain and CNS	Brain and spinal cord (CNS)	CNS	20	Nervous system and eye	6	1		0	1
D	62	X- and Gamma radiation	Human	Thyroid	Thyroid	Thyroid	23	Endocrine system	7	1		0	1
D	62	X- and Gamma radiation	Rat	Thyroid	Thyroid	Thyroid	23	Endocrine system	7	1		0	1
D	62	X- and Gamma radiation	Mouse	Pituitary gland	Pituitary	Pituitary	25	Endocrine system	7	1		0	1
D	62	X- and Gamma radiation	Human	Kidney	Kidney	Kidney	26	Kidney	8	1		0	1
D	62	X- and Gamma radiation	Monkey (Rhesus)	Kidney	Kidney	Kidney	26	Kidney	8	1		0	1
D	62	X- and Gamma radiation	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
D	62	X- and Gamma radiation	Mouse	Haematopoietic tissue	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
D	62	X- and Gamma radiation	Human	Leukaemia (excl. chronic lymphocytic leukaemia)	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
D	62	X- and Gamma radiation	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
D	62	X- and Gamma radiation	Mouse	Thymus	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
D	62	X- and Gamma radiation	Human	Basal cell of the skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
D	62	X- and Gamma radiation	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
D	62	X- and Gamma radiation	Human	Bbone	Hard connective tissue (bone, cartilage)	Hard connective tissue	34	Connective tissues	12	1		0	1
D	62	X- and Gamma radiation	Human	Female breast	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
D	62	X- and Gamma radiation	Mouse	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1

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Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
D	62	X- and Gamma radiation	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
D	62	X- and Gamma radiation	Mouse	Ovary	Ovary	Ovary	36	Female breast, female reproductive organs and reproductive tract	13	1		0	1
D	62	X- and Gamma radiation	Mouse	Harderian gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		0	1
E	63	Acetaldehyde associated with consumption of alcoholic beverages	Human	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	0	7	0	1
E	63	Acetaldehyde associated with consumption of alcoholic beverages	Human	Pharynx	Pharynx	Pharynx	4	Upper aerodigestive tract	1	0	7	0	1
E	63	Acetaldehyde associated with consumption of alcoholic beverages	Human	Larynx	Larynx	Larynx	9	Respiratory system	2	0	7	0	1
E	63	Acetaldehyde associated with consumption of alcoholic beverages	Human	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	0	7	0	1
E	64	Alcoholic beverages	Human	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
E	64	Alcoholic beverages	Rat	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
E	64	Alcoholic beverages	Human	Pharynx	Pharynx	Pharynx	4	Upper aerodigestive tract	1	1		0	1
E	64	Alcoholic beverages	Human	Larynx	Larynx	Larynx	9	Respiratory system	2	1		0	1
E	64	Alcoholic beverages	Human	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	1		0	1
E	64	Alcoholic beverages	Human	Colorectum	Intestine, including colon and rectum	Intestine	16	Digestive tract	4	1		0	1
E	64	Alcoholic beverages	Human	Hepatocellular carcinoma	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
E	64	Alcoholic beverages	Human	breast	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
E	65	Areca nut	Human	Not specified						1		0	0
E	65	Areca nut	Hamster	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	0
E	65	Areca nut	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	0
E	66	Betel quid with tobacco	Human	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	0	7	0	1
E	66	Betel quid with tobacco	Human	Pharynx	Pharynx	Pharynx	4	Upper aerodigestive tract	1	0	7	0	1
E	66	Betel quid with tobacco	Human	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	0	7	0	1
E	67	Betel quid without tobacco	Human	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
E	67	Betel quid without tobacco	Human	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	1		0	1
E	67	Betel quid without tobacco	Hamster	Forestomach	Stomach	Stomach	15	Digestive tract	4	1		0	1
E	68	Coal, indoor emissions from household combustion of	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
E	68	Coal, indoor emissions from household combustion of	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
E	68	Coal, indoor emissions from household combustion of	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
E	69	Ethanol in alcoholic beverages	Human	Not specified						1		0	0
E	69	Ethanol in alcoholic beverages	Rat	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	0
E	70	N'-Nitrosomnicotine (NNN) and 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanon (NNK)	Hamster	Nasal cavity	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		1	0
E	70	N'-Nitrosomnicotine (NNN) and 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanon (NNK)	Hamster	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
E	70	N'-Nitrosomnicotine (NNN) and 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanon (NNK)	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
E	70	N'-Nitrosomnicotine (NNN) and 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanon (NNK)	Rat	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	1		1	0
E	70	N'-Nitrosomnicotine (NNN) and 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanon (NNK)	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		1	0
E	70	N'-Nitrosomnicotine (NNN) and 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanon (NNK)	Human	Not specified						1		1	0

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
E	71	Salted fish, chinese style	Rat	Nasal cavity	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
E	71	Salted fish, chinese style	Rat	Paranasal sinus	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
E	71	Salted fish, chinese style	Rat	Nasopharynx	Nasopharynx	Nasopharynx	2	Upper aerodigestive tract	1	1		0	1
E	71	Salted fish, chinese style	Human	Nasopharynx	Nasopharynx	Nasopharynx	2	Upper aerodigestive tract	1	1		0	1
E	72	Second-hand tobacco smoke	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
E	72	Second-hand tobacco smoke	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
E	73	Tobacco smoking	Human	Nasal cavity	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
E	73	Tobacco smoking	Human	Paranasal sinus	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
E	73	Tobacco smoking	Human	Nasopharynx	Nasopharynx	Nasopharynx	2	Upper aerodigestive tract	1	1		0	1
E	73	Tobacco smoking	Human	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
E	73	Tobacco smoking	Human	pharynx (incl. oropharynx & hypopharynx)	Pharynx	Pharynx	4	Upper aerodigestive tract	1	1		0	1
E	73	Tobacco smoking	Human	Larynx	Larynx	Larynx	9	Respiratory system	2	1		0	1
E	73	Tobacco smoking	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
E	73	Tobacco smoking	Hamster	Larynx	Larynx	Larynx	9	Respiratory system	2	1		0	1
E	73	Tobacco smoking	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
E	73	Tobacco smoking	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
E	73	Tobacco smoking	Human	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	1		0	1
E	73	Tobacco smoking	Human	Stomach	Stomach	Stomach	15	Digestive tract	4	1		0	1
E	73	Tobacco smoking	Human	Colorectum	Intestine, including colon and rectum	Intestine	16	Digestive tract	4	1		0	1
E	73	Tobacco smoking	Human	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
E	73	Tobacco smoking	Human	Hepatoblastoma in children (parental smoking)	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
E	73	Tobacco smoking	Human	Pancreas	Pancreas NOS	Pancreas	18	Digestive organs	5	1		0	1
E	73	Tobacco smoking	Human	Kidney	Kidney	Kidney	26	Kidney	8	1		0	1
E	73	Tobacco smoking	Human	Ureter	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
E	73	Tobacco smoking	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
E	73	Tobacco smoking	Human	Myeloid leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
E	73	Tobacco smoking	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
E	73	Tobacco smoking	Human	ovary	Ovary	Ovary	36	Female breast, female reproductive organs and reproductive tract	13	1		0	1
E	73	Tobacco smoking	Human	Uterine cervix	Uterine cervix	Cervix	37	Female breast, female reproductive organs and reproductive tract	13	1		0	1
E	74	Tobacco, smokeless	Rat	Lip	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
E	74	Tobacco, smokeless	Human	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
E	74	Tobacco, smokeless	Rat	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
E	74	Tobacco, smokeless	Human	Oesophagus	Oesophagus	Oesophagus	14	Digestive tract	4	1		0	1
E	74	Tobacco, smokeless	Human	Pancreas	Pancreas NOS	Pancreas	18	Digestive organs	5	1		0	1
F	75	Acid mists, strong inorganic	Human	Larynx	Larynx	Larynx	9	Respiratory system	2	0	1	0	1
F	76	Aflatoxins	Human	Hepatocellular carcinoma	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	76	Aflatoxins	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	77	Aluminum production	Human	Lung	Lung	Lung	10	Respiratory system	2	0	7	0	1
F	77	Aluminum production	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	7	0	1
F	78	4-Aminobiphenyl	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	78	4-Aminobiphenyl	Dog	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
F	78	4-Aminobiphenyl	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	78	4-Aminobiphenyl	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
F	79	Auramine production	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	1	0	1
F	80	Benzene	Rat	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
F	80	Benzene	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	80	Benzene	Rat	Forestomach	Stomach	Stomach	15	Digestive tract	4	1		0	1
F	80	Benzene	Human	Acute myeloid leukaemia/acute non-lymphocytic leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
F	80	Benzene	Mouse	Haematopoietic tissue	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
F	80	Benzene	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
F	80	Benzene	Mouse	Thymus	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
F	80	Benzene	Rat	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	80	Benzene	Mouse	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
F	80	Benzene	Mouse	Preputial gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		0	1
F	80	Benzene	Mouse	Zymbal gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		0	1
F	80	Benzene	Rat	Zymbal gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		0	1
F	81	Benzidine	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	81	Benzidine	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	81	Benzidine	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
F	82	Benzidine, dyes metabolized to	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		1	0
F	82	Benzidine, dyes metabolized to	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		1	0
F	82	Benzidine, dyes metabolized to	Human	Not specified						1		1	0
F	83	Benzo[a]pyrene	Hamster	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
F	83	Benzo[a]pyrene	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
F	83	Benzo[a]pyrene	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
F	83	Benzo[a]pyrene	Hamster	Lower respiratory tract (larynx, trachea, lung)	Lower respiratory tract	Lower respiratory tract	11	Respiratory system	2	1		1	0
F	83	Benzo[a]pyrene	Hamster	Forestomach	Stomach	Stomach	15	Digestive tract	4	1		1	0
F	83	Benzo[a]pyrene	Mouse	Forestomach	Stomach	Stomach	15	Digestive tract	4	1		1	0
F	83	Benzo[a]pyrene	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		1	0
F	83	Benzo[a]pyrene	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		1	0
F	83	Benzo[a]pyrene	Hamster	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		1	0
F	83	Benzo[a]pyrene	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		1	0
F	83	Benzo[a]pyrene	Rat	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		1	0
F	83	Benzo[a]pyrene	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		1	0
F	83	Benzo[a]pyrene	Human	Not specified						1		1	0
F	84	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Rat	Nasal cavity	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
F	84	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	84	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
F	84	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
F	85	1,3-Butadiene	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	85	1,3-Butadiene	Mouse	Forestomach	Stomach	Stomach	15	Digestive tract	4	1		0	1
F	85	1,3-Butadiene	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	85	1,3-Butadiene	Human	Haematolymphatic organs	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
F	85	1,3-Butadiene	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
F	85	1,3-Butadiene	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
F	85	1,3-Butadiene	Mouse	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
F	85	1,3-Butadiene	Mouse	Harderian gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		0	1
F	85	1,3-Butadiene	Mouse	Preputial gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		0	1
F	86	Coal gasification	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	86	Coal gasification	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	87	Coal-tar distillation	Human	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	87	Coal-tar distillation	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	88	Coal-tar pitch	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	88	Coal-tar pitch	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	89	Coke production	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	89	Coke production	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	89	Coke production	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	89	Coke production	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	90	Ethylene oxide	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
F	90	Ethylene oxide	Rat	Peritoneum	Mesothelium	Mesothelium	12	Mesothelium	3	1		1	0
F	90	Ethylene oxide	Rat	Brain	Brain and spinal cord (CNS)	CNS	20	Nervous system and eye	6	1		1	0
F	90	Ethylene oxide	Rat	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		1	0
F	90	Ethylene oxide	Human	Not specified						1		1	0
F	91	Formaldehyde	Rat	Nasal cavity	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	1		0	1
F	91	Formaldehyde	Human	Nasopharynx	Nasopharynx	Nasopharynx	2	Upper aerodigestive tract	1	1		0	1
F	91	Formaldehyde	Human	Leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	1		0	1
F	92	Iron and steel founding (occupational exposure during)	Human	Lung	Lung	Lung	10	Respiratory system	2	0	1	0	1
F	93	Isopropyl alcohol manufacture using strong acids	Human	Nasal cavity	Nasal cavity and paranasal sinuses	Nasal cavity	1	Upper aerodigestive tract	1	0	1	0	1
F	94	Magenta production	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	1	0	1
F	95	4,4'-Methylenebis(2-chloroaniline) (MOCA)	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		1	0
F	95	4,4'-Methylenebis(2-chloroaniline) (MOCA)	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		1	0
F	95	4,4'-Methylenebis(2-chloroaniline) (MOCA)	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		1	0
F	95	4,4'-Methylenebis(2-chloroaniline) (MOCA)	Human	Not specified						1		1	0
F	96	Mineral oils, untreated or mildly treated	Human	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	96	Mineral oils, untreated or mildly treated	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	97	2-Naphthylamine	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	97	2-Naphthylamine	Dog	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1

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Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data ^a	Mechanistic Upgrade	Human Tumour Site Specified
F	97	2-Naphthylamine	Hamster	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	97	2-Naphthylamine	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	97	2-Naphthylamine	Monkey	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	97	2-Naphthylamine	Rat	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	98	<i>ortho</i> -Toluidine	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	98	<i>ortho</i> -Toluidine	Rat	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	1		0	1
F	98	<i>ortho</i> -Toluidine	Rat	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	98	<i>ortho</i> -Toluidine	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
F	99	Painter, occupational exposure	Human	Lung	Lung	Lung	10	Respiratory system	2	0	1	0	1
F	99	Painter, occupational exposure	Human	Mesothelioma	Mesothelium	Mesothelium	12	Mesothelium	3	0	1	0	1
F	99	Painter, occupational exposure	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	1	0	1
F	100	2,3,4,7,8-Pentachlorodibenzofuran	Human	Not specified						0	7	1	0
F	101	Rubber manufacturing industry	Human	Lung	Lung	Lung	10	Respiratory system	2	0	1	0	1
F	101	Rubber manufacturing industry	Human	Stomach	Stomach	Stomach	15	Digestive tract	4	0	1	0	1
F	101	Rubber manufacturing industry	Human	Urinary bladder	Urothelium (renal pelvis, ureter, urinary bladder)	Urothelium	27	Urothelium	9	0	1	0	1
F	101	Rubber manufacturing industry	Human	Leukaemia	Haematopoietic tissue	Haematopoietic tissue	28	Lymphoid and haematopoietic tissues	10	0	1	0	1
F	101	Rubber manufacturing industry	Human	Lymphoma	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	0	1	0	1
F	102	Shale oils	Human	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	102	Shale oils	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	103	Soot (as found in occupational exposure of chimney sweeps)	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	103	Soot (as found in occupational exposure of chimney sweeps)	Human	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	103	Soot (as found in occupational exposure of chimney sweeps)	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	104	Sulfur mustard	Human	Lung	Lung	Lung	10	Respiratory system	2	0	6	0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Rat	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Lymphoid tissue	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Thymus	Lymphoid tissue	Lymphoid tissue	29	Lymphoid and haematopoietic tissues	10	1		0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Skin	Skin and adnexae	Skin and adnexae	30	Skin	11	1		0	1
F	105	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Human	All cancers combined	All cancers combined	All cancers combined	43	Other groupings	15	1		0	1
F	106	Vinyl chloride	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
F	106	Vinyl chloride	Human	Hepatocellular carcinoma	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
F	106	Vinyl chloride	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1

Supplemental Table 2. Database of Animal and Human Tumour Sites for 111 Distinct Group-1 Agents through Volume 109 of the IARC Monographs													
Volume	Agent Number	Agent Name	Species	Site	Anatomical Site	Anatomical Site Label	Anatomical Site Number	Organ System	Organ System Number	Animal Tumour Site Specified	Reason for Lack of Animal Data*	Mechanistic Upgrade	Human Tumour Site Specified
F	106	Vinyl chloride	Mouse	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
F	106	Vinyl chloride	Rat	Soft tissue	Soft connective tissue	Soft connective tissue	32	Connective tissues	12	1		0	1
F	106	Vinyl chloride	Human	Angiosarcoma of the liver	Blood vasculature (endothelium)	Blood vasculature	33	Connective tissues	12	1		0	1
F	106	Vinyl chloride	Mouse	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
F	106	Vinyl chloride	Rat	Mammary gland	Breast	Breast	35	Female breast, female reproductive organs and reproductive tract	13	1		0	1
F	106	Vinyl chloride	Rat	Zymbal gland	Exocrine glands NOS	Exocrine glands NOS	47	Other groupings	15	1		0	1
105	107	Engine Exhaust, diesel	Human	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
105	107	Engine Exhaust, diesel	Rat	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
106	108	Trichloroethylene	Mouse	Lung	Lung	Lung	10	Respiratory system	2	1		0	1
106	108	Trichloroethylene	Mouse	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
106	108	Trichloroethylene	Human	Kidney	Kidney	Kidney	26	Kidney	8	1		0	1
106	108	Trichloroethylene	Rat	Kidney	Kidney	Kidney	26	Kidney	8	1		0	1
107	109	Polychlorinated biphenyls	Rat	Oral cavity	Oral cavity	Oral cavity	3	Upper aerodigestive tract	1	1		0	1
107	109	Polychlorinated biphenyls	Rat	Liver	Liver parenchyma and bile ducts	Liver	17	Digestive organs	5	1		0	1
107	109	Polychlorinated biphenyls	Human	Skin (melanoma)	Cutaneous melanocytes	Cutaneous melanocytes	31	Skin	11	1		0	1
109	110	Outdoor air pollution	Human	Lung	Lung	Lung	10	Respiratory system	2	0	7	0	1
109	111	Particulate matter in outdoor air pollution	Human	Lung	Lung	Lung	10	Respiratory system	2	0	7	0	1

*Reasons for Lack of Animal Data: 1 - Occupational exposure not replicable in laboratory; 2 - Used in combination with no data on mixture; 3 - Animal models problematic due to species-specificity
4 - Animal tests inadequate; 5 - No animal data available; 6 - Limited evidence in animals ; 7 - Sufficient evidence in animals, but no site specified

Supplemental Table 3. Data Dictionary for the Anatomically-based Tumour Site Concordance Database

Data Element	Description	Coding
Volume	IARC Monographs Volume from which the data were abstracted	100A, 100B, 100C, 100D, 100E, 100F, 105, 106, 107, 109
Agent Number	Number assigned to agents listed in alphabetical order (see Table 1)	1, 2,...,111
Agent Name	Name of the agent as listed in the IARC Monographs	
Species	Species from which the data were derived	Human, Rat, Mouse, Hamster, Dog, Monkey, Baboon
Site	The tumour site, as abstracted from the IARC Monographs (see Table 1)	
Anatomical Site	Coding of the tumour site into an anatomical site based on The Organ and Tumour Site Nomenclature Table	See Table 3
Anatomical Site Number	Number assigned to anatomical tumour site	1, 2,..., 47(see Table 4)
Organ System	Organ and tissue system to which the anatomical tumour site belongs	See Table 3
Organ System Number	Number assigned to the organ and tissue system	1, 2,...,15 (see Table 4)
Animal Data Available	Indicator variable indicating the availability of	0- No animal data available 1- Animal data available
Reason for Lack of Animal Data	Reason for lack of sufficient evidence of carcinogenicity in animals	1-Occupational exposures are complex and likely could not be reliably replicated in the laboratory 2- Used in combination; no data available on mixture 3- Animal tests were conducted by are considered inadequate

		<p>4-The use of animal models is problematic due to species-specificity and other limitations</p> <p>5- No animal data available</p>
Mechanistic Upgrade	Indicator variable to identify agents assigned to Group-1 on the basis of a mechanistic upgrade	<p>0- No mechanistic upgrade</p> <p>1- Mechanistic upgrade</p>
Tumour Site Specified	Indicator variable to confirm the determination of a specific tumour site by the WG	<p>0- No tumour site specified</p> <p>1- Tumour site(s) specified</p>

Supplemental Table 4. Numerical Coding of Anatomically-based Tumour Sites and Organ and Tissue Systems

Anatomical Site	Anatomical Site Number
<i>Upper Aerodigestive Tract (1)</i>	
Nasal cavity and paranasal sinuses	1
Nasopharynx	2
Oral cavity	3
Pharynx	4
Tongue	5
Tonsil	6
Salivary gland	7
<i>Respiratory System (2)</i>	
Trachea	8
Larynx	9
Lung	10
Lower respiratory tract	11
<i>Mesothelium (3)</i>	
Mesothelium	12
<i>Digestive Tract (4)</i>	
Digestive tract, unspecified	13
Oesophagus	14
Stomach	15
Intestine (including colon and rectum)	16
<i>Digestive Organs (5)</i>	
Liver parenchyma and bile ducts	17
Pancreas NOS	18
Gall bladder	19
<i>Nervous System and Eye (6)</i>	

Brain and spinal cord (CNS)	20
Cranial and peripheral nerves	21
Eye	22
<i>Endocrine System (7)</i>	
Thyroid, follicular epithelium	23
Adrenal gland (medulla, cortex, NOS)	24
Pituitary	25
<i>Kidney (8)</i>	
Kidney (renal cortex, renal medulla, kidney NOS)	26
<i>Urothelium (9)</i>	
Urothelium (renal pelvis or ureter or urinary bladder)	27
<i>Lymphoid and Haematopoietic Tissues (10)</i>	
Haematopoietic tissue	28
Lymphoid tissue	29
<i>Skin (11)</i>	
Skin and adnexae	30
Cutaneous melanocytes	31
<i>Connective Tissues (12)</i>	
Soft connective tissue	32
Blood vasculature (endothelium)	33
Hard connective tissue (bone, cartilage)	34
<i>Female Breast, Female Reproductive Organs and Reproductive Tract (13)</i>	
Breast	35
Ovary	36
Uterine cervix	37
Uterus	38
Vulva/vagina	39
<i>Male Reproductive System (14)</i>	

Testis, germ cells	40
Testis, specialized gonadal stroma	41
Prostate	42
<i>Other Groupings (15)</i>	
All cancers combined	43
All solid cancers	44
Solid cancers, aside from lung	45
Multiple or unspecified sites	46
Exocrine glands NOS	47

Supplemental Table 5. Group-1 Agents With at Least One Tumour Site Specified in Humans and in Animals (60 agents)

Volume	Agent	Species	Tissue Site	Organ and Tissue System
A	Aristolochic acid, plants containing	Rat	Stomach	Digestive tract
A	Aristolochic acid, plants containing	Human	Urothelium	Urothelium
A	Aristolochic acid, plants containing	Rat	Urothelium	Urothelium
A	Aristolochic acid, plants containing	Human	Urothelium	Urothelium
A	Azathioprine	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
A	Azathioprine	Human	Lymphoid tissue	Lymphoid and haematopoietic tissues
A	Azathioprine	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
A	Azathioprine	Human	Skin and adnexae	Skin
A	Chlorambucil	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
A	Chlorambucil	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
A	Cyclophosphamide	Mouse	Lung	Respiratory system
A	Cyclophosphamide	Human	Urothelium	Urothelium
A	Cyclophosphamide	Rat	Urothelium	Urothelium
A	Cyclophosphamide	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
A	Cyclophosphamide	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
A	Cyclophosphamide	Mouse	Breast	Female breast, female reproductive organs and reproductive tract
A	Diethylstilbestrol	Hamster	Kidney	Kidney
A	Diethylstilbestrol	Human	Breast	Female breast, female reproductive organs and reproductive tract
A	Diethylstilbestrol	Human	Cervix	Female breast, female reproductive organs and reproductive tract
A	Diethylstilbestrol	Mouse	Cervix	Female breast, female reproductive organs and reproductive tract
A	Diethylstilbestrol	Mouse	Uterus	Female breast, female reproductive organs and reproductive tract
A	Diethylstilbestrol	Human	Vulva/vagina	Female breast, female reproductive organs and reproductive tract
A	Estrogen-only menopausal therapy	Hamster	Kidney	Kidney
A	Estrogen-only menopausal therapy	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
A	Estrogen-only menopausal therapy	Mouse	Breast	Female breast, female reproductive organs and reproductive tract
A	Estrogen-only menopausal therapy	Rat	Breast	Female breast, female reproductive organs and reproductive tract
A	Estrogen-only menopausal therapy	Human	Ovary	Female breast, female reproductive organs and reproductive tract
A	Estrogen-only menopausal therapy	Mouse	Cervix	Female breast, female reproductive organs and reproductive tract
A	Estrogen-only menopausal therapy	Human	Uterus	Female breast, female reproductive organs and reproductive tract
A	Estrogen-only menopausal therapy	Mouse	Uterus	Female breast, female reproductive organs and reproductive tract
A	Estrogen-progestogen oral contraceptives (combined)	Human	Liver	Digestive organs
A	Estrogen-progestogen oral contraceptives (combined)	Human	Breast	Female breast, female reproductive organs and reproductive tract
A	Estrogen-progestogen oral contraceptives (combined)	Human	Cervix	Female breast, female reproductive organs and reproductive tract
A	Estrogen-progestogen oral contraceptives (combined)	Rat	Breast	Female breast, female reproductive organs and reproductive tract
A	Methoxsalen in combination with UVA	Mouse	Skin and adnexae	Skin
A	Methoxsalen in combination with UVA	Human	Skin and adnexae	Skin
A	Phenacetin	Mouse	Kidney	Kidney
A	Phenacetin	Rat	Kidney	Kidney
A	Phenacetin	Human	Urothelium	Urothelium
A	Phenacetin	Rat	Urothelium	Urothelium
A	Phenacetin	Human	Urothelium	Urothelium
A	Tamoxifen	Rat	Liver	Digestive organs
A	Tamoxifen	Human	Uterus	Female breast, female reproductive organs and reproductive tract
A	Thiotepa	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
A	Thiotepa	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
B	Helicobacter pylori (infection with)	Mouse	Stomach	Digestive tract
B	Helicobacter pylori (infection with)	Human	Stomach	Digestive tract
B	Helicobacter pylori (infection with)	Human	Lymphoid tissue	Lymphoid and haematopoietic tissues
C	Arsenic and inorganic arsenic compounds	Human	Lung	Respiratory system
C	Arsenic and inorganic arsenic compounds	Mouse	Lung	Respiratory system
C	Arsenic and inorganic arsenic compounds	Mouse	Liver	Digestive organs
C	Arsenic and inorganic arsenic compounds	Human	Urothelium	Urothelium
C	Arsenic and inorganic arsenic compounds	Rat	Urothelium	Urothelium
C	Arsenic and inorganic arsenic compounds	Human	Skin and adnexae	Skin
C	Asbestos (all forms)	Human	Larynx	Respiratory system
C	Asbestos (all forms)	Human	Lung	Respiratory system
C	Asbestos (all forms)	Rat	Lung	Respiratory system
C	Asbestos (all forms)	Human	Mesothelium	Mesothelium
C	Asbestos (all forms)	Baboon	Mesothelium	Mesothelium
C	Asbestos (all forms)	Hamster	Mesothelium	Mesothelium
C	Asbestos (all forms)	Rat	Mesothelium	Mesothelium
C	Asbestos (all forms)	Human	Ovary	Female breast, female reproductive organs and reproductive tract
C	Beryllium and beryllium compounds	Human	Lung	Respiratory system
C	Beryllium and beryllium compounds	Rat	Lung	Respiratory system
C	Cadmium and cadmium compounds	Human	Lung	Respiratory system
C	Cadmium and cadmium compounds	Rat	Lung	Respiratory system
C	Cadmium and cadmium compounds	Rat	Soft connective tissue	Connective tissues
C	Chromium (VI) compounds	Rat	Oral cavity	Upper aerodigestive tract
C	Chromium (VI) compounds	Rat	Tongue	Upper aerodigestive tract
C	Chromium (VI) compounds	Human	Lung	Respiratory system
C	Chromium (VI) compounds	Rat	Lung	Respiratory system
C	Chromium (VI) compounds	Mouse	Intestine	Digestive tract
C	Chromium (VI) compounds	Mouse	Intestine	Digestive tract
C	Chromium (VI) compounds	Mouse	Intestine	Digestive tract
C	Chromium (VI) compounds	Mouse	Intestine	Digestive tract
C	Chromium (VI) compounds	Mouse	Intestine	Digestive tract
C	Chromium (VI) compounds	Rat	Soft connective tissue	Connective tissues
C	Erionite	Human	Mesothelium	Mesothelium
C	Erionite	Rat	Mesothelium	Mesothelium
C	Nickel compounds	Human	Nasal cavity	Upper aerodigestive tract
C	Nickel compounds	Human	Lung	Respiratory system
C	Nickel compounds	Rat	Lung	Respiratory system

Supplemental Table 5. Group-1 Agents With at Least One Tumour Site Specified in Humans and in Animals (60 agents)

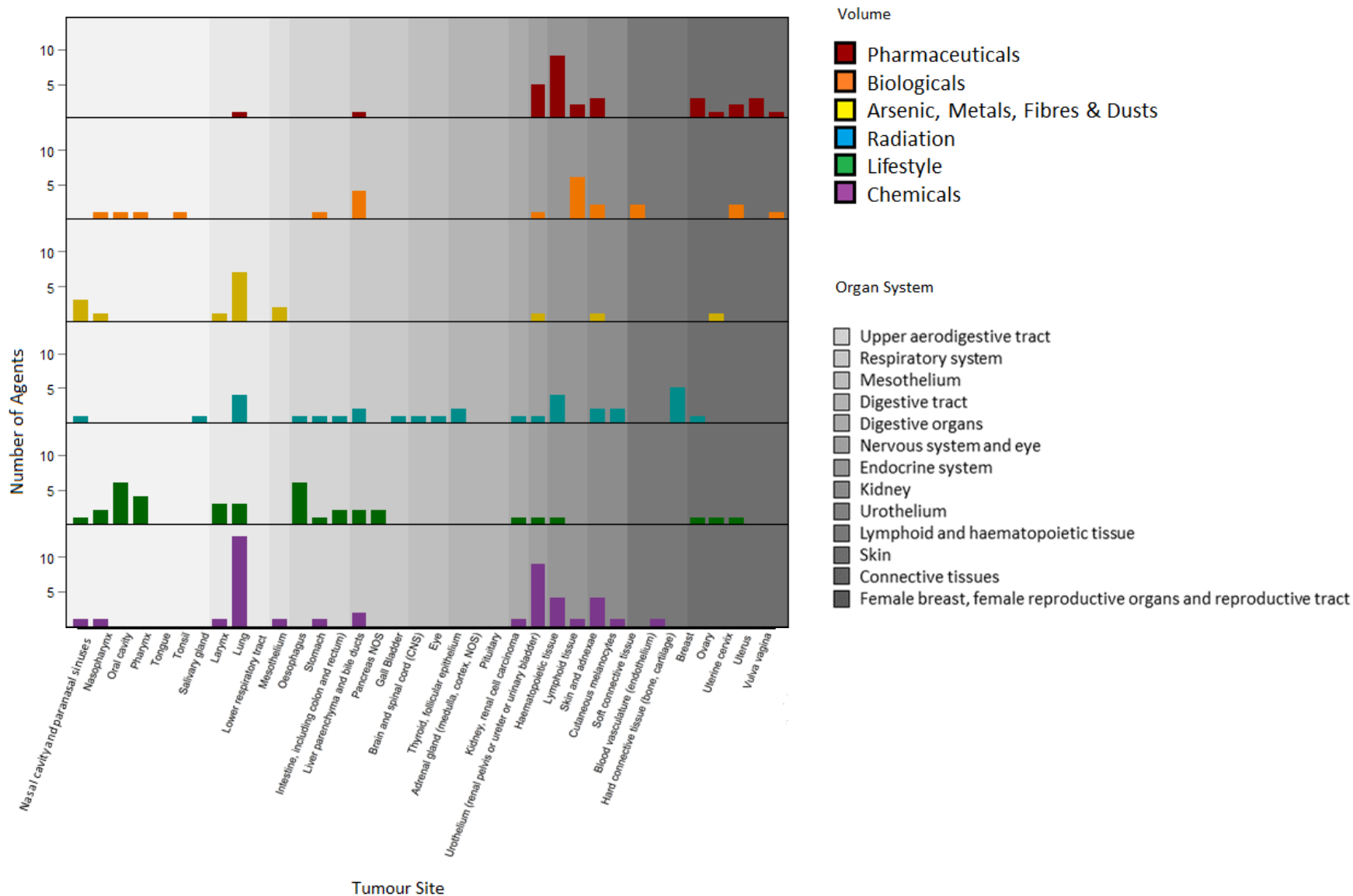
Volume	Agent	Species	Tissue Site	Organ and Tissue System
C	Nickel compounds	Rat	Adrenal gland	Endocrine system
C	Nickel compounds	Hamster	Soft connective tissue	Connective tissues
C	Nickel compounds	Mouse	Soft connective tissue	Connective tissues
C	Nickel compounds	Rat	Soft connective tissue	Connective tissues
C	Silica dust, crystalline, in the form of quartz or cristobalite	Human	Lung	Respiratory system
C	Silica dust, crystalline, in the form of quartz or cristobalite	Rat	Lung	Respiratory system
C	Silica dust, crystalline, in the form of quartz or cristobalite	Rat	Lymphoid tissue	Lymphoid and haematopoietic tissues
D	Fission products including Sr-90	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
D	Fission products including Sr-90	Dog	Hard connective tissue	Connective tissues
D	Fission products including Sr-90	Mouse	Hard connective tissue	Connective tissues
D	Fission products including Sr-90	Human	All solid cancers	Other groupings
D	Haematite mining with exposure to radon (underground)	Human	Lung	Respiratory system
D	Haematite mining with exposure to radon (underground)	Rat	Lung	Respiratory system
D	Pu-239	Dog	Lung	Respiratory system
D	Pu-239	Human	Lung	Respiratory system
D	Pu-239	Rat	Lung	Respiratory system
D	Pu-239	Dog	Liver	Digestive organs
D	Pu-239	Human	Liver	Digestive organs
D	Pu-239	Human	Hard connective tissue	Connective tissues
D	Pu-239	Dog	Hard connective tissue	Connective tissues
D	Pu-239	Mouse	Hard connective tissue	Connective tissues
D	Pu-239	Rat	Hard connective tissue	Connective tissues
D	Radioiodines, including I-131	Human	Thyroid	Endocrine system
D	Radioiodines, including I-131	Mouse	Thyroid	Endocrine system
D	Radioiodines, including I-131	Rat	Thyroid	Endocrine system
D	Ra-224 and its decay products	Human	Hard connective tissue	Connective tissues
D	Ra-224 and its decay products	Dog	Hard connective tissue	Connective tissues
D	Ra-224 and its decay products	Mouse	Hard connective tissue	Connective tissues
D	Ra-226 and its decay products	Human	Nasal cavity	Upper aerodigestive tract
D	Ra-226 and its decay products	Human	Hard connective tissue	Connective tissues
D	Ra-226 and its decay products	Human	Hard connective tissue	Connective tissues
D	Ra-226 and its decay products	Dog	Hard connective tissue	Connective tissues
D	Ra-226 and its decay products	Mouse	Hard connective tissue	Connective tissues
D	Ra-228 and its decay products	Human	Hard connective tissue	Connective tissues
D	Ra-228 and its decay products	Dog	Hard connective tissue	Connective tissues
D	Rn-222 and its decay products	Human	Lung	Respiratory system
D	Rn-222 and its decay products	Rat	Lung	Respiratory system
D	Solar radiation	Mouse	Skin and adnexae	Skin
D	Solar radiation	Rat	Skin and adnexae	Skin
D	Solar radiation	Human	Skin and adnexae	Skin
D	Solar radiation	Human	Cutaneous melanocytes	Skin
D	Th-232 (as Thorotrast)	Human	Liver	Digestive organs
D	Th-232 (as Thorotrast)	Hamster	Liver	Digestive organs
D	Th-232 (as Thorotrast)	Human	Liver	Digestive organs
D	Th-232 (as Thorotrast)	Rat	Liver	Digestive organs
D	Th-232 (as Thorotrast)	Human	Gall bladder	Digestive organs
D	Th-232 (as Thorotrast)	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
D	UV-emitting tanning devices	Human	Eye	Nervous system and eye
D	UV-emitting tanning devices	Mouse	Skin and adnexae	Skin
D	UV-emitting tanning devices	Human	Cutaneous melanocytes	Skin
D	X- and Gamma radiation	Human	Salivary gland	Upper aerodigestive tract
D	X- and Gamma radiation	Human	Lung	Respiratory system
D	X- and Gamma radiation	Mouse	Lung	Respiratory system
D	X- and Gamma radiation	Human	Oesophagus	Digestive tract
D	X- and Gamma radiation	Human	Stomach	Digestive tract
D	X- and Gamma radiation	Human	Intestine	Digestive tract
D	X- and Gamma radiation	Mouse	Liver	Digestive organs
D	X- and Gamma radiation	Human	CNS	Nervous system and eye
D	X- and Gamma radiation	Human	Thyroid	Endocrine system
D	X- and Gamma radiation	Rat	Thyroid	Endocrine system
D	X- and Gamma radiation	Mouse	Pituitary	Endocrine system
D	X- and Gamma radiation	Human	Kidney	Kidney
D	X- and Gamma radiation	Monkey	Kidney	Kidney
D	X- and Gamma radiation	Human	Urothelium	Urothelium
D	X- and Gamma radiation	Mouse	Haematopoietic tissue	Lymphoid and haematopoietic tissues
D	X- and Gamma radiation	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
D	X- and Gamma radiation	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
D	X- and Gamma radiation	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
D	X- and Gamma radiation	Human	Skin and adnexae	Skin
D	X- and Gamma radiation	Mouse	Soft connective tissue	Connective tissues
D	X- and Gamma radiation	Human	Hard connective tissue	Connective tissues
D	X- and Gamma radiation	Human	Breast	Female breast, female reproductive organs and reproductive tract
D	X- and Gamma radiation	Mouse	Breast	Female breast, female reproductive organs and reproductive tract
D	X- and Gamma radiation	Rat	Breast	Female breast, female reproductive organs and reproductive tract
D	X- and Gamma radiation	Mouse	Ovary	Female breast, female reproductive organs and reproductive tract
D	X- and Gamma radiation	Mouse	Exocrine glands NOS	Other groupings
E	Alcoholic beverages	Human	Oral cavity	Upper aerodigestive tract
E	Alcoholic beverages	Rat	Oral cavity	Upper aerodigestive tract
E	Alcoholic beverages	Human	Pharynx	Upper aerodigestive tract
E	Alcoholic beverages	Human	Larynx	Respiratory system
E	Alcoholic beverages	Human	Oesophagus	Digestive tract

Supplemental Table 5. Group-1 Agents With at Least One Tumour Site Specified in Humans and in Animals (60 agents)

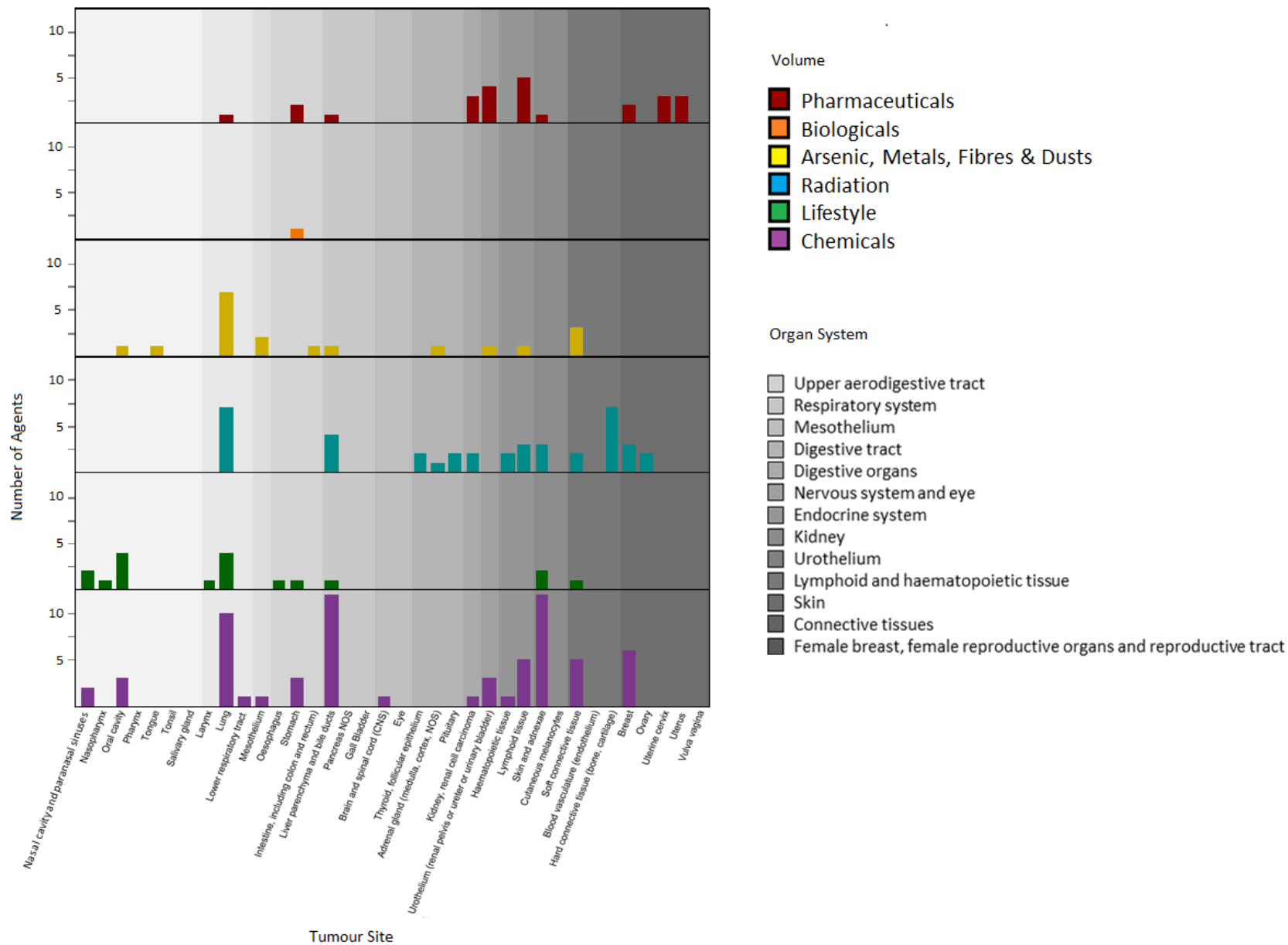
Volume	Agent	Species	Tissue Site	Organ and Tissue System
E	Alcoholic beverages	Human	Intestine	Digestive tract
E	Alcoholic beverages	Human	Liver	Digestive organs
E	Alcoholic beverages	Human	Breast	Female breast, female reproductive organs and reproductive tract
E	Betel quid without tobacco	Human	Oral cavity	Upper aerodigestive tract
E	Betel quid without tobacco	Human	Oesophagus	Digestive tract
E	Betel quid without tobacco	Hamster	Stomach	Digestive tract
E	Coal, indoor emissions from household combustion of	Human	Lung	Respiratory system
E	Coal, indoor emissions from household combustion of	Mouse	Lung	Respiratory system
E	Coal, indoor emissions from household combustion of	Mouse	Skin and adnexae	Skin
E	Salted fish, chinese style	Rat	Nasal cavity	Upper aerodigestive tract
E	Salted fish, chinese style	Rat	Nasal cavity	Upper aerodigestive tract
E	Salted fish, chinese style	Rat	Nasopharynx	Upper aerodigestive tract
E	Salted fish, chinese style	Human	Nasopharynx	Upper aerodigestive tract
E	Second-hand tobacco smoke	Human	Lung	Respiratory system
E	Second-hand tobacco smoke	Mouse	Lung	Respiratory system
E	Tobacco smoking	Human	Nasal cavity	Upper aerodigestive tract
E	Tobacco smoking	Human	Nasal cavity	Upper aerodigestive tract
E	Tobacco smoking	Human	Nasopharynx	Upper aerodigestive tract
E	Tobacco smoking	Human	Oral cavity	Upper aerodigestive tract
E	Tobacco smoking	Human	Pharynx	Upper aerodigestive tract
E	Tobacco smoking	Human	Larynx	Respiratory system
E	Tobacco smoking	Human	Lung	Respiratory system
E	Tobacco smoking	Hamster	Larynx	Respiratory system
E	Tobacco smoking	Mouse	Lung	Respiratory system
E	Tobacco smoking	Rat	Lung	Respiratory system
E	Tobacco smoking	Human	Oesophagus	Digestive tract
E	Tobacco smoking	Human	Stomach	Digestive tract
E	Tobacco smoking	Human	Intestine	Digestive tract
E	Tobacco smoking	Human	Liver	Digestive organs
E	Tobacco smoking	Human	Liver	Digestive organs
E	Tobacco smoking	Human	Pancreas	Digestive organs
E	Tobacco smoking	Human	Kidney	Kidney
E	Tobacco smoking	Human	Urothelium	Urothelium
E	Tobacco smoking	Human	Urothelium	Urothelium
E	Tobacco smoking	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
E	Tobacco smoking	Mouse	Skin and adnexae	Skin
E	Tobacco smoking	Human	Ovary	Female breast, female reproductive organs and reproductive tract
E	Tobacco smoking	Human	Cervix	Female breast, female reproductive organs and reproductive tract
E	Tobacco, smokeless	Rat	Oral cavity	Upper aerodigestive tract
E	Tobacco, smokeless	Human	Oral cavity	Upper aerodigestive tract
E	Tobacco, smokeless	Rat	Oral cavity	Upper aerodigestive tract
E	Tobacco, smokeless	Human	Oesophagus	Digestive tract
E	Tobacco, smokeless	Human	Pancreas	Digestive organs
F	Aflatoxins	Human	Liver	Digestive organs
F	Aflatoxins	Rat	Liver	Digestive organs
F	4-Aminobiphenyl	Mouse	Liver	Digestive organs
F	4-Aminobiphenyl	Dog	Urothelium	Urothelium
F	4-Aminobiphenyl	Human	Urothelium	Urothelium
F	4-Aminobiphenyl	Mouse	Soft connective tissue	Connective tissues
F	Benzene	Rat	Oral cavity	Upper aerodigestive tract
F	Benzene	Mouse	Lung	Respiratory system
F	Benzene	Rat	Stomach	Digestive tract
F	Benzene	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
F	Benzene	Mouse	Haematopoietic tissue	Lymphoid and haematopoietic tissues
F	Benzene	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
F	Benzene	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
F	Benzene	Rat	Skin and adnexae	Skin
F	Benzene	Mouse	Breast	Female breast, female reproductive organs and reproductive tract
F	Benzene	Mouse	Exocrine glands NOS	Other groupings
F	Benzene	Mouse	Exocrine glands NOS	Other groupings
F	Benzene	Rat	Exocrine glands NOS	Other groupings
F	Benzidine	Mouse	Liver	Digestive organs
F	Benzidine	Human	Urothelium	Urothelium
F	Benzidine	Rat	Breast	Female breast, female reproductive organs and reproductive tract
F	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Rat	Nasal cavity	Upper aerodigestive tract
F	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Human	Lung	Respiratory system
F	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Mouse	Skin and adnexae	Skin
F	Bis(chloromethyl)ether; chloromethyl methyl ether (technical-grade)	Mouse	Soft connective tissue	Connective tissues
F	1,3-Butadiene	Mouse	Lung	Respiratory system
F	1,3-Butadiene	Mouse	Stomach	Digestive tract
F	1,3-Butadiene	Mouse	Liver	Digestive organs
F	1,3-Butadiene	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
F	1,3-Butadiene	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
F	1,3-Butadiene	Mouse	Soft connective tissue	Connective tissues
F	1,3-Butadiene	Mouse	Breast	Female breast, female reproductive organs and reproductive tract
F	1,3-Butadiene	Mouse	Exocrine glands NOS	Other groupings
F	1,3-Butadiene	Mouse	Exocrine glands NOS	Other groupings
F	Coal gasification	Human	Lung	Respiratory system
F	Coal gasification	Mouse	Skin and adnexae	Skin
F	Coal-tar distillation	Human	Skin and adnexae	Skin
F	Coal-tar distillation	Mouse	Skin and adnexae	Skin

Supplemental Table 5. Group-1 Agents With at Least One Tumour Site Specified in Humans and in Animals (60 agents)

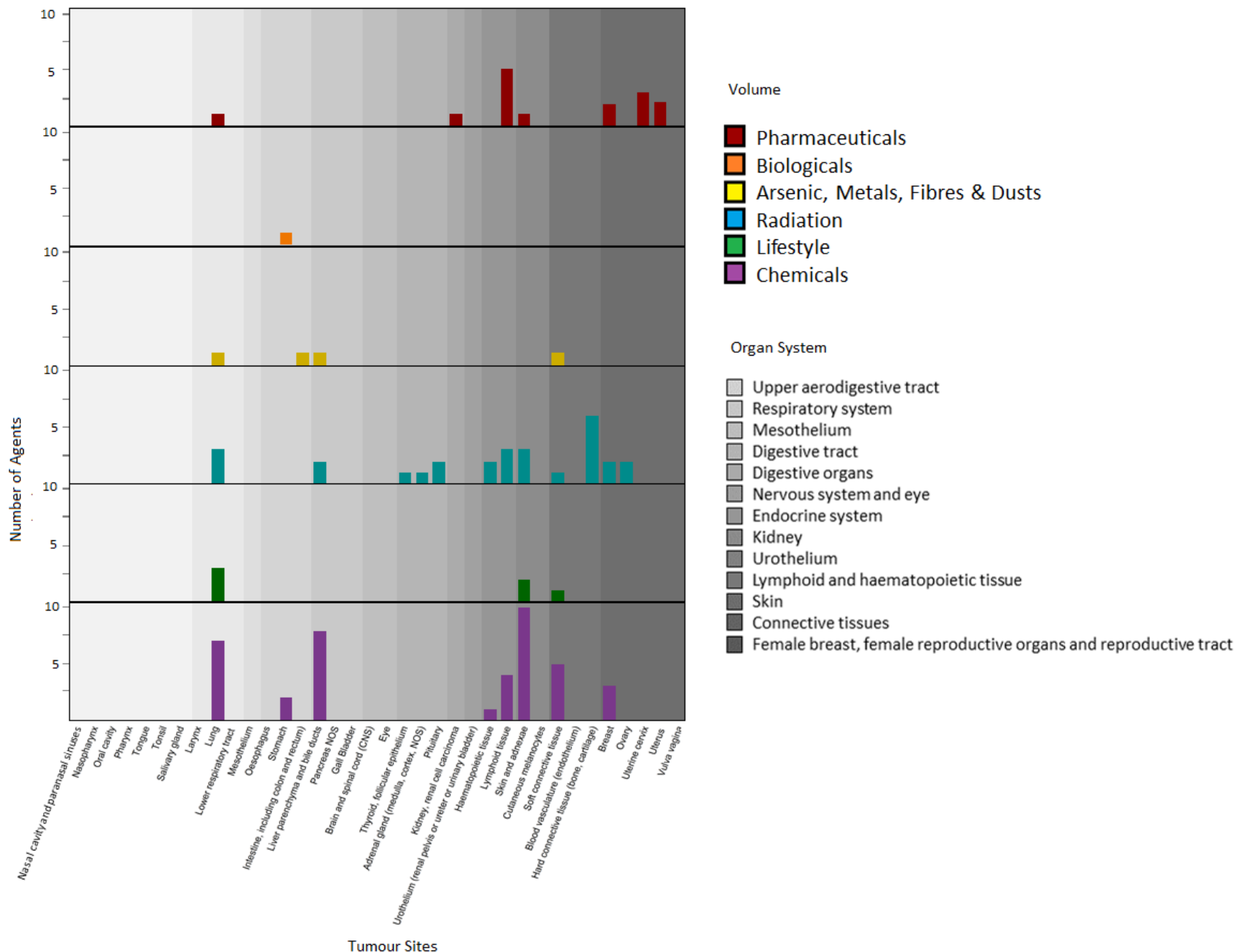
Volume	Agent	Species	Tissue Site	Organ and Tissue System
F	Coal-tar pitch	Human	Lung	Respiratory system
F	Coal-tar pitch	Mouse	Skin and adnexae	Skin
F	Coke production	Human	Lung	Respiratory system
F	Coke production	Mouse	Lung	Respiratory system
F	Coke production	Rat	Lung	Respiratory system
F	Coke production	Mouse	Skin and adnexae	Skin
F	Formaldehyde	Rat	Nasal cavity	Upper aerodigestive tract
F	Formaldehyde	Human	Nasopharynx	Upper aerodigestive tract
F	Formaldehyde	Human	Haematopoietic tissue	Lymphoid and haematopoietic tissues
F	Mineral oils, untreated or mildly treated	Human	Skin and adnexae	Skin
F	Mineral oils, untreated or mildly treated	Mouse	Skin and adnexae	Skin
F	2-Naphthylamine	Mouse	Liver	Digestive organs
F	2-Naphthylamine	Dog	Urothelium	Urothelium
F	2-Naphthylamine	Hamster	Urothelium	Urothelium
F	2-Naphthylamine	Human	Urothelium	Urothelium
F	2-Naphthylamine	Monkey	Urothelium	Urothelium
F	2-Naphthylamine	Rat	Urothelium	Urothelium
F	ortho-Toluidine	Human	Urothelium	Urothelium
F	ortho-Toluidine	Rat	Urothelium	Urothelium
F	ortho-Toluidine	Rat	Skin and adnexae	Skin
F	ortho-Toluidine	Mouse	Soft connective tissue	Connective tissues
F	Shale oils	Human	Skin and adnexae	Skin
F	Shale oils	Mouse	Skin and adnexae	Skin
F	Soot (as found in occupational exposure of chimney sweeps)	Human	Lung	Respiratory system
F	Soot (as found in occupational exposure of chimney sweeps)	Human	Skin and adnexae	Skin
F	Soot (as found in occupational exposure of chimney sweeps)	Mouse	Skin and adnexae	Skin
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Rat	Oral cavity	Upper aerodigestive tract
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Rat	Lung	Respiratory system
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Liver	Digestive organs
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Rat	Liver	Digestive organs
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Lymphoid tissue	Lymphoid and haematopoietic tissues
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Mouse	Skin and adnexae	Skin
F	2,3,7,8-Tetrachlorodibenzo-para-dioxin	Human	All cancers combined	Other groupings
F	Vinyl chloride	Mouse	Lung	Respiratory system
F	Vinyl chloride	Human	Liver	Digestive organs
F	Vinyl chloride	Rat	Liver	Digestive organs
F	Vinyl chloride	Mouse	Soft connective tissue	Connective tissues
F	Vinyl chloride	Rat	Soft connective tissue	Connective tissues
F	Vinyl chloride	Human	Blood vasculature	Connective tissues
F	Vinyl chloride	Mouse	Breast	Female breast, female reproductive organs and reproductive tract
F	Vinyl chloride	Rat	Breast	Female breast, female reproductive organs and reproductive tract
F	Vinyl chloride	Rat	Exocrine glands NOS	Other groupings
F	Engine Exhaust, diesel	Human	Lung	Respiratory system
F	Engine Exhaust, diesel	Rat	Lung	Respiratory system
F	Trichloroethylene	Mouse	Lung	Respiratory system
F	Trichloroethylene	Mouse	Liver	Digestive organs
F	Trichloroethylene	Human	Kidney	Kidney
F	Trichloroethylene	Rat	Kidney	Kidney
F	Polychlorinated biphenyls	Rat	Oral cavity	Upper aerodigestive tract
F	Polychlorinated biphenyls	Rat	Liver	Digestive organs
F	Polychlorinated biphenyls	Human	Cutaneous melanocytes	Skin



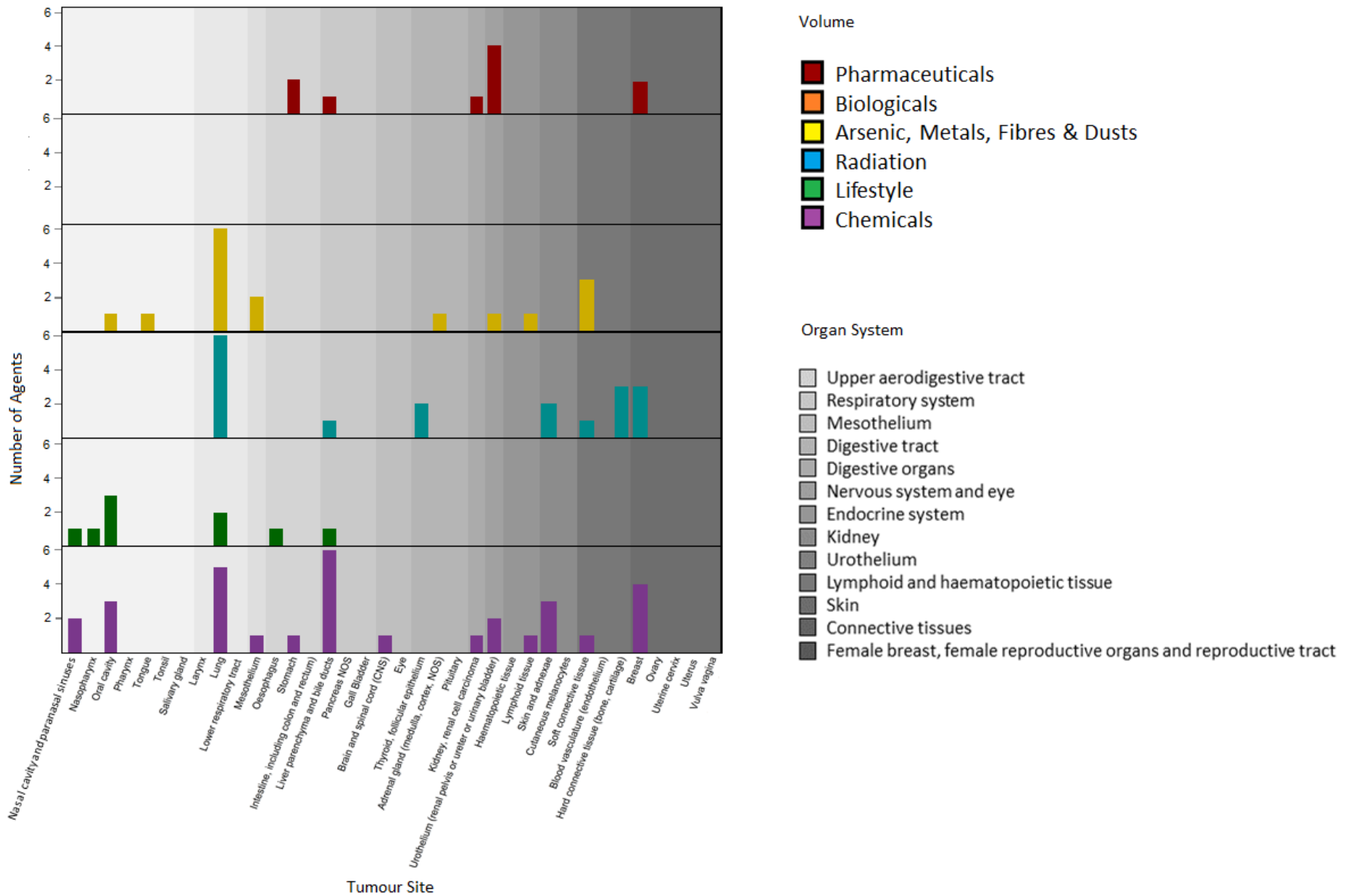
Supplemental Figure 1: Number of Agents Inducing Tumours in Humans in Each of 39 Tumour Sites by Type of Agent



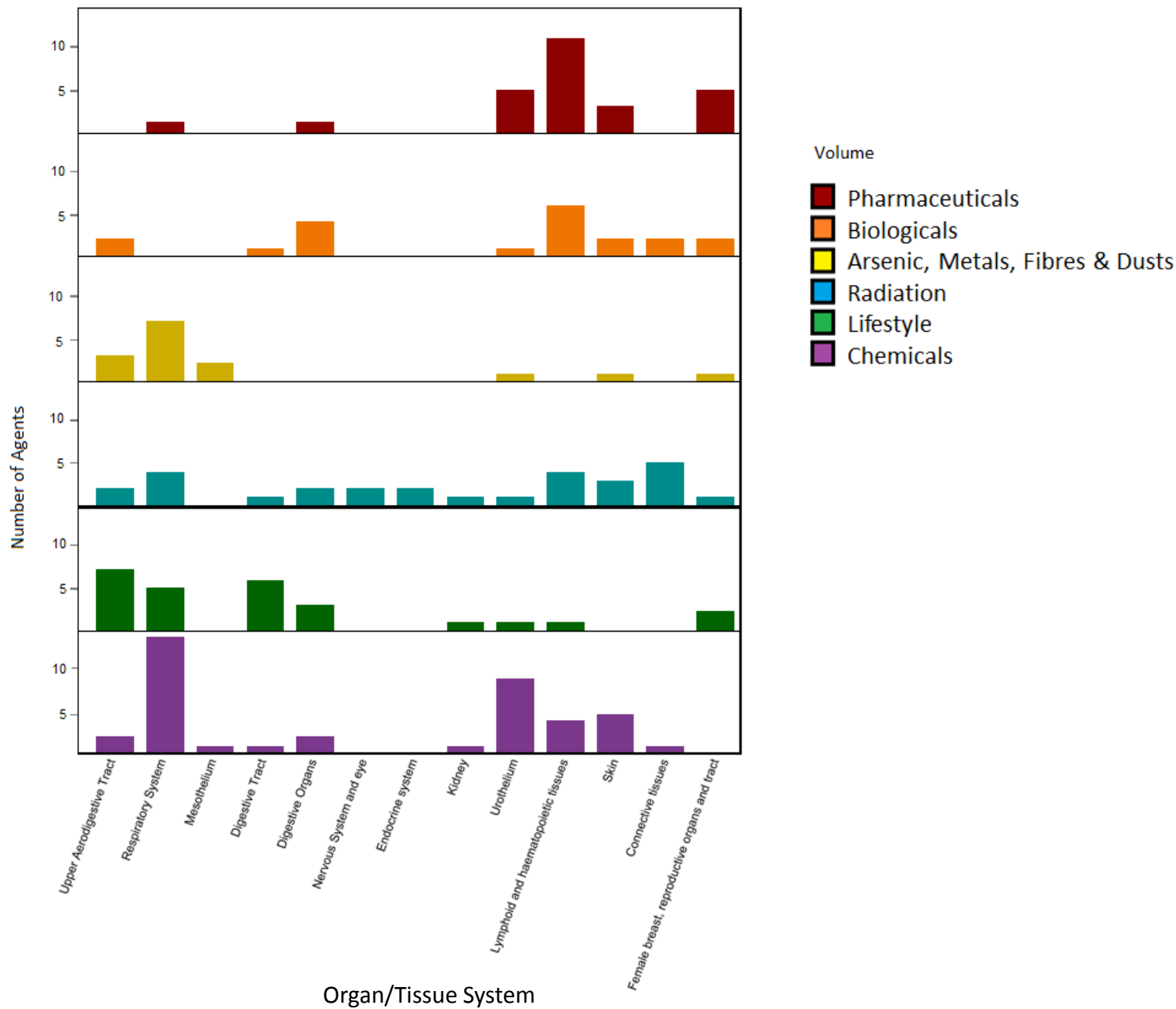
Supplemental Figure 2: Number of Agents Inducing Tumours in Animals in Each of 39 Tumour Sites by Type of Agent



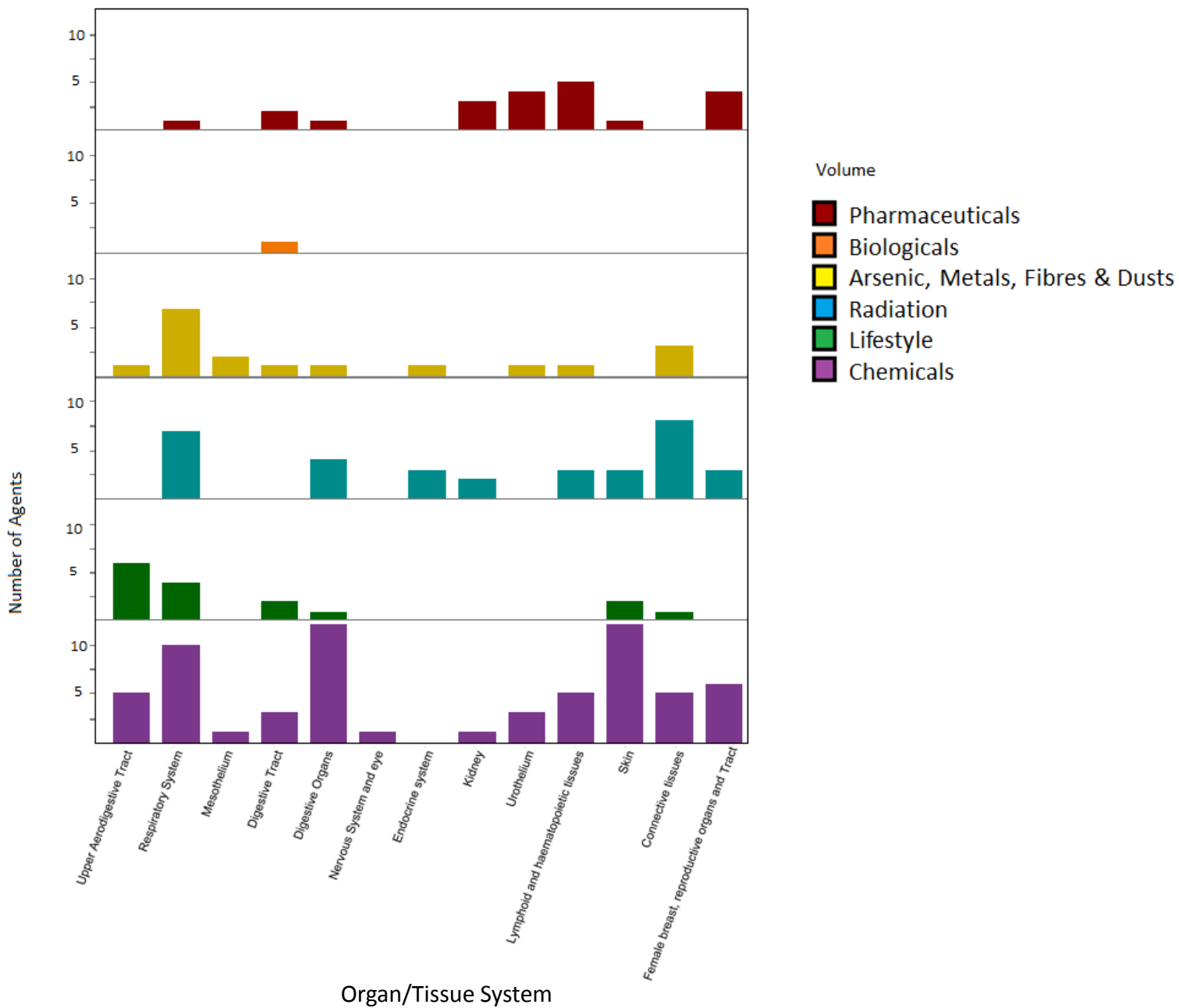
Supplemental Figure 3: Number of Agents Inducing Tumours in Mice in Each of 39 Tumour Sites by Type of Agent



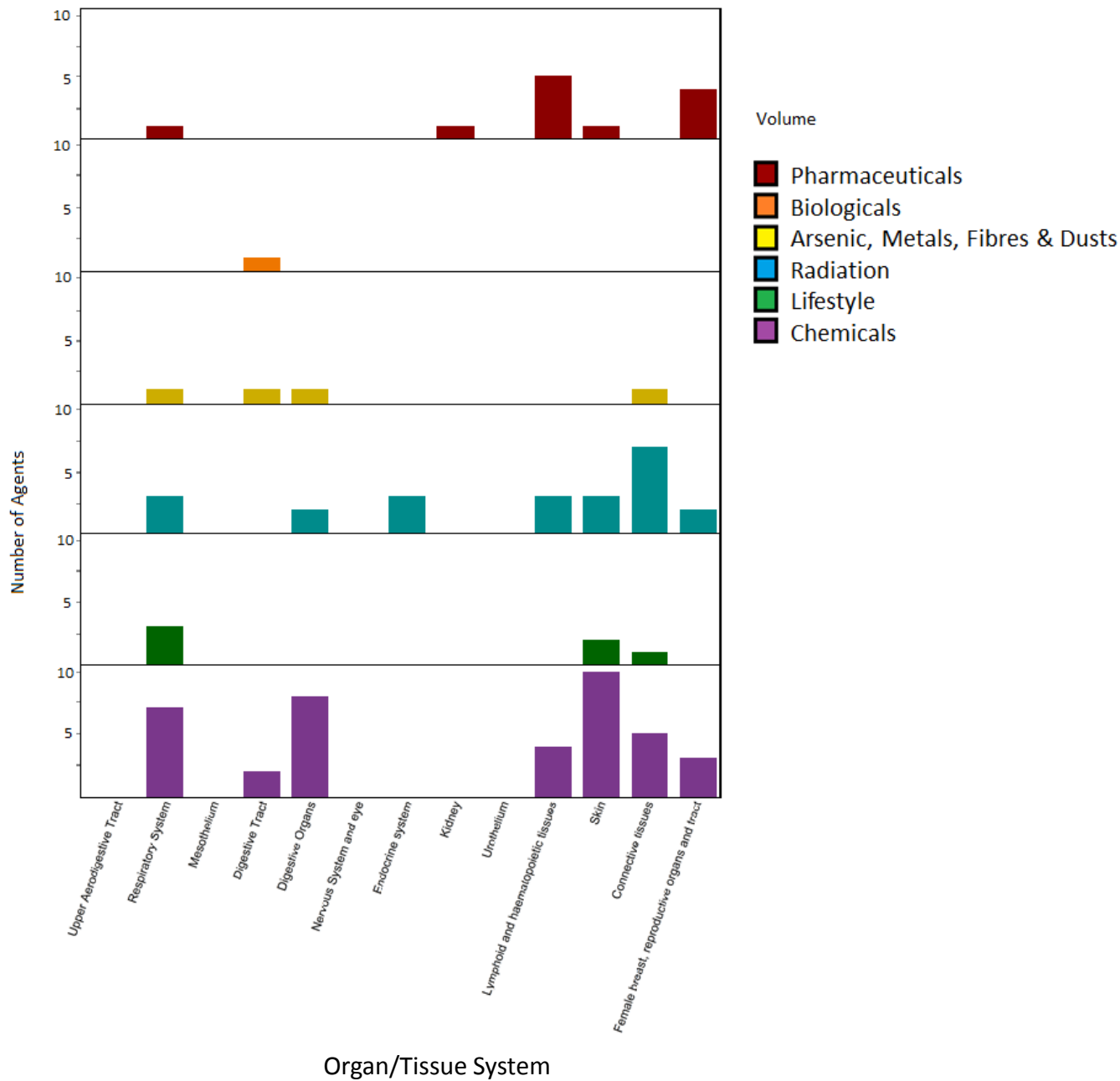
Supplemental Figure 4: Number of Agents Inducing Tumours in Rats in Each of 39 Tumour Sites by Type of Agent



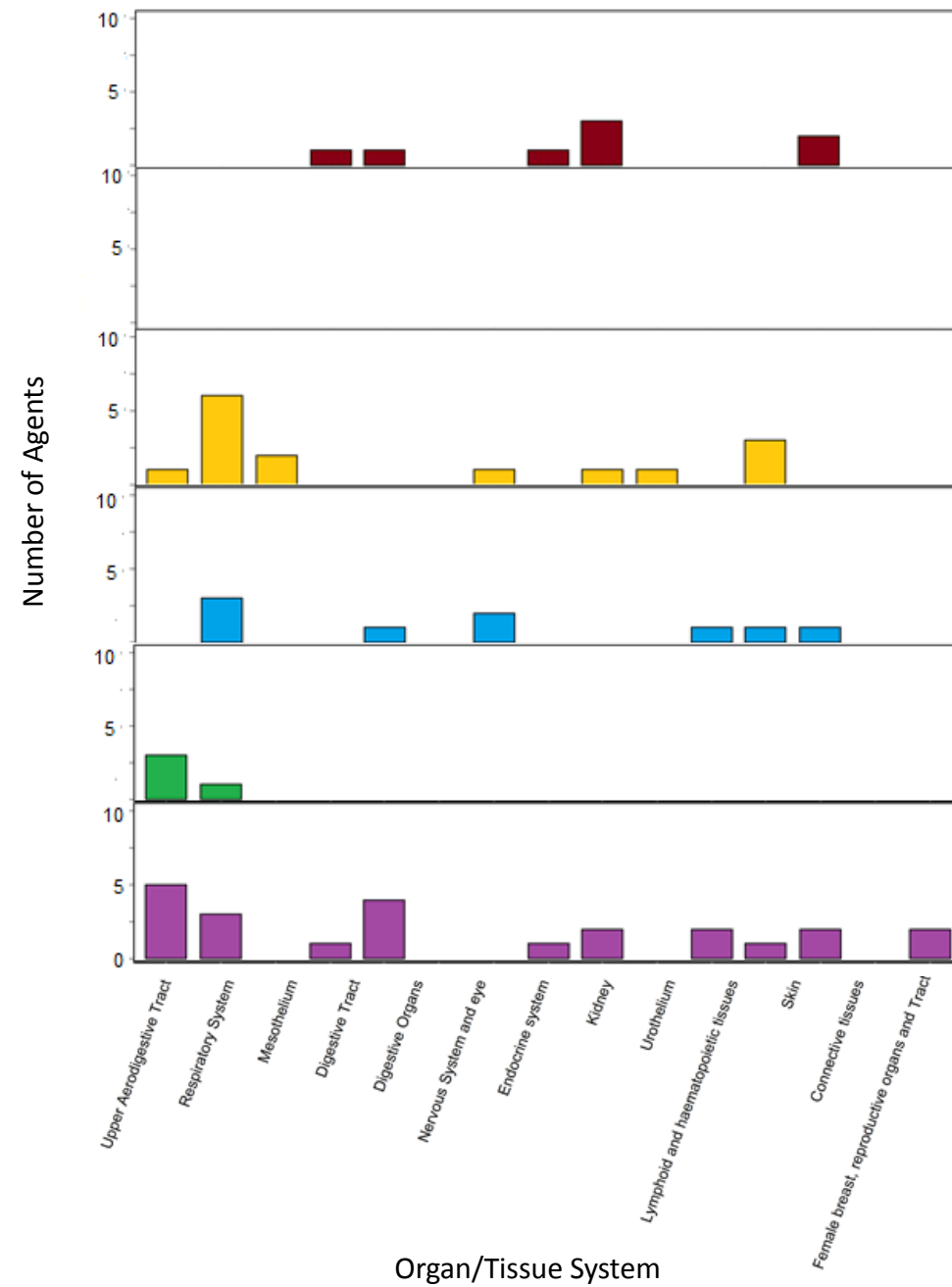
Supplemental Figure 5: Number of Agents Inducing Tumours in Humans in Each of 15 Organ/Tissue Systems by Type of Agent



Supplemental Figure 6: Number of Agents Inducing Tumours in Animals in Each of 15 Organ/Tissue Systems by Type of Agent



Supplemental Figure 7: Number of Agents Inducing Tumours in Mice in Each of 15 Organ/Tissue Systems by Type of Agent



Volume

- Pharmaceuticals
- Biologicals
- Arsenic, Metals, Fibres & Dusts
- Radiation
- Lifestyle
- Chemicals

Supplemental Figure 8: Number of Agents Inducing Tumours in Rats in Each of 15 Organ/Tissue Systems by Type of Agent