TECHNICAL REPORT
RERF TR 18-78
業 績 報 告 書

RERF PATHOLOGY STUDIES, HIROSHIMA AND NAGASAKI
放影研病理学的調査，広島・長崎

REPORT 4

THE AUTOPSY PROGRAM AND THE LIFE SPAN STUDY JANUARY 1961 – DECEMBER 1975

第 4 報

剖検プログラムと寿命調査 1961年1月—1975年12月

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A cooperative Japan - United States Research Organization
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ACKNOWLEDGMENT

謝　辞

In the 25-year history of the autopsy program many persons and organizations have collaborated to make the program possible. The cooperation and support received from the Departments of Pathology of the Hiroshima and Nagasaki Universities as well as from the Medical Associations, medical institutions, and physicians of the two cities have been indispensable to the conduct of the autopsy program. Special mention should be made of the advice and counsel received from the consultants, and the continuous support of the ABCC and JNIH directors including the JNIH branch laboratories in Hiroshima and Nagasaki, and board members of RERF.

Thanks are due to the several Chiefs of the Department of Pathology for their management of the program and to staff members mere words cannot adequately express appreciation for the many hours of work by the prosectors and pathology technicians, and the painstaking recording of their observations. To the members of the Department of Medical Sociology grateful acknowledgment is made for their earnest efforts in soliciting autopsies. Deepest appreciation is expressed to the citizens of Hiroshima and Nagasaki for their immeasurable cooperation.

25年にわたるこの剖検プログラムの遂行のために，多くの方々並びに機関の御協力を頂いた．広島・長崎両大学の医学部病理学教室，医師会，各医療機関，並びに両市在住の医師の方々から頂いた協力並びに助言は，剖検プログラムの遂行上不可欠なものであった．また，顧問の方々から頂いた助言，ABCC所長，広島・長崎両予研支所長及び放影研理事の方々の絶えざる御援助についても特記したい．

剖検プログラムの運営に当たられた歴代の病理部長に謝意を表する．剖検執刀医師や病理技術員の長時間にわたる剖検作業，並びに骨の折れる観察結果の記録作業を遂行されたことに対する感謝の念は筆舌に尽くし難い．剖検入手に献身的な努力をされた医科社会学部職員に対しても謝辞を述べたい．計りしれない御協力を頂いた広島・長崎の市民の方々に対しては殊に深甚な謝意を表するものである．

A paper based on this report was published in the following journal:

本報告に基づく論文は下記の雑誌に掲載された．

Hiroshima Igaku - J Hiroshima Med Assoc 32:267-76, 1979

放影研 RERF RADIATION EFFECTS RESEARCH FOUNDATION
財団法人 放射線影響研究所

Research Project 研究課題 3-75

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SUMMARY

This fourth report in the ABCC-JNIH series of pathology studies extends the data of Reports 1,2 and 3 by adding and summarizing the autopsy findings from 1971 to 1975. Autopsies were performed on 4,920 (31%) of the 15,929 Life Span Study (LSS) subjects who died between 1961-75. The autopsy rate reached a peak of 45% in 1963, then declined steadily to 15% in 1975. From 1971 to 1975, the autopsy rate averaged 19%.

Autopsy rates for 1961-75 were significantly higher for Adult Health Study (AHS) subjects, all of whom are regularly examined. Those not in the AHS sample do not report for clinical examinations. Autopsy rates were also higher by dose for selected causes of death, such as malignant neoplasms. Throughout this study, autopsies were performed when deaths occurred in hospitals, clinics, or at home. During 1961-75, 25.5% of those dying at home were autopsied – an unusual achievement characterizing the nature of procurement in this program.

The correspondence between autopsy and death certificate diagnoses is presented by cancer site, and for cerebrovascular and cardiovascular diseases. Confirmation and detection rates for cerebrovascular and cardiovascular diseases were low compared to those for malignant neoplasms. For individual cancer sites, however, there was often disagreement between the death certificate and autopsy findings.

要 約

本報はABCC－予研病理学的調査の第4報であり，第1，2及び第3報の資料に1971－75年間の剖検所見を追補し，総括したものである．1961－75年の期間における寿命調査（LSS）集団中の死亡者15,929例のうち，4,920例（31%）の剖検を実施した．剖検率は1963年の45%を最高にその後徐々に下降をたどり，1975年には15%にまで低下した．1971－75年間の平均剖検率は19%であった．

1961－75年間の剖検率は，定期検診を受けている成人健康調査（AHS）対象者の方が有意に高かった．成人健康調査集団に所属しない者の臨床的検討は行われていない．また，特定死因，例えば悪性新生物による死亡例の剖検率も被曝線量に応じて高かった．本調査の全期間を通じて，病院，医院，又は家庭で死亡した例について剖検が行われた．1961－75年間に家庭死亡例の25.5%が剖検を受けたが，これはこのプログラムにおける剖検入手方法の性質を反映する異例の成果である．

剖検診断と死亡診断書の診断との一致性については，部位別の癌，脳血管障害，及び心血管障害を中心に考察を行った．脳血管障害及び心血管障害の確認率及び発見率は，悪性新生物の両率と比べて低かった．しかし，個々の癌の部位別にみた場合は，死亡診断書と剖検所見との間に不一致がしばしば認められた．

Approved 承認 4 December 1978

Printed 印刷 September 1979

INTRODUCTION

The RERF Pathology Studies have included an epidemiologically oriented autopsy program since the organization of the Unified Study Program in 1961.[1] The Pathology Studies are related to two other major programs – the LSS and AHS. The LSS population is a fixed sample of approximately 100,000 members comprised of A-bomb survivors and controls in Hiroshima and Nagasaki, selected to study the effects of radiation exposure by dose. The AHS sample is a subsample of about 20,000 persons included in the LSS who receive complete physical examinations biennially at RERF. The autopsy sample is obtained from deaths in the LSS sample. However, deaths for which radiation exposure is not known were excluded from this report.

Permission for autopsy is solicited by RERF autopsy contactors. In perhaps 80% of the deaths, the family's first indication of RERF interest in the deceased is the approach of autopsy contactors with a request for autopsy permission, the remaining 20% being aware of RERF interest because the deceased had been a member of the AHS sample. Under these conditions, the procurement of permission for autopsy is a delicate process requiring great tact, patience, understanding, and the active collaboration of the family physician and of the people of the two cities. Over the period 1961-75, 31% of all LSS deaths have been autopsied.

The LSS autopsies are of two types depending on whether they were performed in hospitals or at RERF. The autopsies performed in hospitals outside of RERF by collaborating pathologists are generally performed shortly after death as part of the routine hospital autopsy program frequently without knowledge on the part of the hospital staff that the patient had been a member of the LSS sample. In 1971-75, these non-RERF autopsies represented less than 5% of deaths in Hiroshima, and less than 10% in Nagasaki. Permission for RERF autopsies is obtained by RERF staff who attempt to persuade the bereaved families of all persons in the LSS sample who die, including persons who die at home and in the clinics. In recent years, RERF autopsies declined and accounted for from 17% to 12% of deaths in Hiroshima, and from 17% to 7% in Nagasaki. Obviously, procurement of autopsy is difficult in spite of all efforts made, leading to serious concern about the value of the autopsy program.

緒　言

1961年に統合研究計画が開始されて以来,[1] 放影研の病理学的調査の一環として疫学的研究に指向性をもつ剖検プログラムが実施されている．病理学的調査は他の二つの大きな調査研究，すなわち，寿命調査と成人健康調査に関連をもつ．寿命調査集団は，放射線の影響を被曝線量別に検討するために選んだ広島・長崎の原爆被爆者及び対照者約100,000名からなる固定集団である．成人健康調査集団は，寿命調査対象者のうち放影研で2年に1回定期検診を受ける約20,000名からなる副次的集団である．剖検標本はこの寿命調査集団の死亡例から入手されている．しかし，本報では，放射線被曝の明らかでない死亡例は除外した．

通常遺族の剖検承諾は放影研剖検連絡員を通じて求められている．死亡者の約80%は，剖検承諾を求めるための連絡員の来訪で放影研が死亡者に関心を持っている事実が初めて遺族に判明するものであり，残り20%のものは，放影研の成人健康調査の対象者であるので放影研が関心のあることは事前に判明している．このような状況下にあるので，剖検承諾手続は微妙なものであり，連絡員の手腕，忍耐，理解並びに主治医と両市の市民の積極的な協力を必要とするのである．1961－75年間に寿命調査集団の全死亡例のうち31%の剖検が行われた．

寿命調査剖検例は，剖検が病院で行われたか放影研で行われたかによって，2種類に分けられる．放影研外部の病院で協力病理医によって行われる剖検は，病院側に患者が寿命調査対象者であるという認識のないまま，その病院の通常剖検プログラムとして死亡直後に実施されるものがほとんどである．1971－75年間の放影研以外での剖検率は，広島の場合，全死亡例の5%未満，長崎の場合，10%未満であった．放影研での剖検承諾は，放影研職員が自宅死亡例，医院死亡例も含めた寿命調査集団中の全死亡者の遺族に対して，説得を努めることによって得られる．近年になって，放影研の剖検率は，広島で全死亡例の17%から12%に，長崎で17%から7%に低下した．明らかに，収集に払った努力に比して剖検例の確保が困難であり，それは今日の剖検プログラムの価値が疑われる端緒となった．

Interpretation of autopsy findings in this report has followed the same procedures described earlier.[2-4] All protocols for 1971-75 were reviewed by Dr. Yamamoto to assure uniformity in selection of the principal autopsy diagnosis as had been done in previous reports.

RERF Pathology Studies Report 4 is an extension of Reports 1, 2, and 3 and its purpose is generally the same as the earlier reports:

To describe and review the characteristics of the autopsy materials collected for deaths in the period 1961-75.

To review the agreement between the underlying cause of death stated on the death certificate and the principal autopsy diagnosis.

To review the relationship between autopsy findings and radiation dose, particularly with regard to malignant neoplasms, cerebrovascular diseases, and cardiovascular diseases.

本報告における剖検所見の解釈は，第1，2，及び3報で述べた方法[2-4]を踏襲する．過去の報告で実施のとおり，主要剖検診断の選定に統一性をもたせるため，著者の一人山本が1971－75年間の全剖検記録の検討を行った．

放影研病理学的調査第4報は，第1，2，3報の延長で，その目的は過去の報告の目的とほぼ同じである．

1961－75年の期間における死亡例から収集した剖検材料の特性の記述並びにその検討．

死亡診断書の原死因と主要剖検診断の合一性の検討．

剖検所見と放射線量との関係，特に悪性腫瘍，脳血管障害及び心血管障害の検討．

AUTOPSY CHARACTERISTICS

Autopsy Rates by City

Prior to 1961 when the autopsy program for the LSS sample began, most autopsies were of persons exposed to high radiation doses, and persons dying from leukemias and malignant neoplasms. With the establishment of the intensive LSS procurement program, it was possible to achieve an autopsy rate of 44.9% for deaths in Hiroshima in 1962, and 45.8% for deaths in Nagasaki in 1963. The autopsy rate declined in Hiroshima for every year but one (1969) between 1962-75, when it had fallen to 14.4%. In Nagasaki, the decline was not as steady, but reached almost as low a proportion (15.1%) in 1975. The average rate for the period 1971-75 was slightly higher for Nagasaki (20.7%) than for Hiroshima (18.2%) (Table 1 and Figure 1).

Place of Autopsy

Over the entire period, the decline in number of deaths autopsied occurred both for autopsies done at RERF and those done outside (Table 2). In Hiroshima, the greatest contribution to the autopsy rate (over 7%) for non-RERF autopsies was made in 1968-70. These deaths accounted for over 20% of all Hiroshima autopsies. The non-RERF autopsies accounted for 21% of Hiroshima autopsies in 1971-75, but both RERF and non-RERF procurement had declined. In

剖検集団の特性

都市別の剖検率

寿命調査集団に対して剖検プログラムが開始される以前の剖検は，高線量被曝者，白血病患者並びに悪性腫瘍患者に主力を置いたものであった．徹底的な寿命調査剖検例収集計画の開始により，1962年には広島で44.9%，1963年には長崎で45.8%の剖検率をあげることができた．しかし，その後1962－75年間の広島の剖検率は逐年的に（1969年だけは例外）下降し，1975年には14.4%に低下した．長崎ではこの下降現象は逐年的ではなかったが，1975年には15.1%という低率に至った．1971－75年間の平均剖検率は，広島（18.2%）より長崎（20.7%）の方がやや高かった（表1及び図1）．

剖検場所

全調査期間を通じて，放影研で行われた剖検例だけでなく放影研以外の施設で行われた剖検例にも減少が認められた（表2）．広島で放影研以外の施設で行われた剖検率（7%以上）は1968－70年に最も高かった．放影研外で剖検の行われたこれら死亡例は，広島の全剖検例の20%以上に相当した．1971－75年間の放影研以外の剖検例は広島の全剖検例の21%に相当したが，放影研と放影研以外の施設を合わせた剖検

FIGURE 1 AUTOPSY RATE IN LSS SAMPLE BY YEAR OF DEATH AND CITY, 1961-75

図1 寿命調査集団における剖検率；死亡年及び都市別，1961－75年

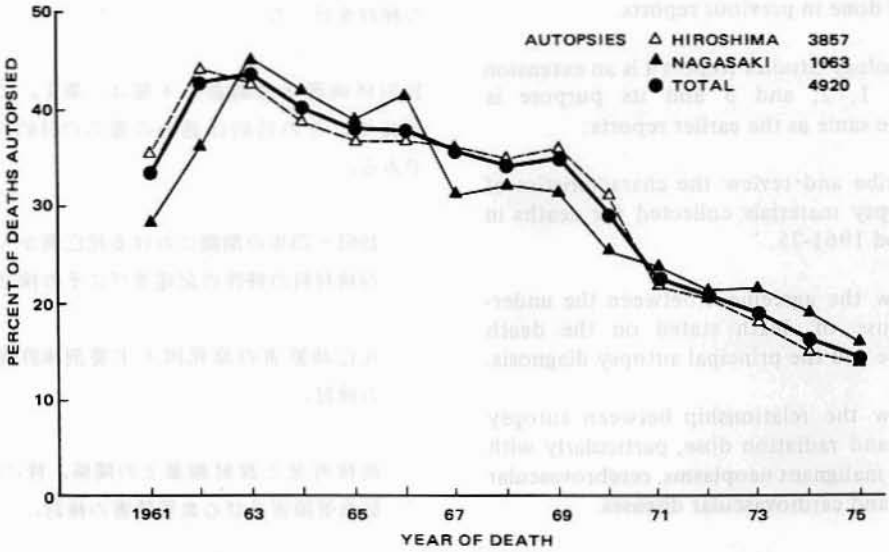


TABLE 1 NUMBER OF LSS DEATHS AND PERCENT AUTOPSIED BY YEAR OF DEATH AND CITY, 1961-75

表1 寿命調査集団における死亡数及び剖検率；死亡年度及び都市別，1961－75年

Year of death	Hiroshima			Nagasaki			Total		
	Deaths	Autopsies	%	Deaths	Autopsies	%	Deaths	Autopsies	%
Total	12449	3857	31.0	3480	1063	30.5	15929	4920	30.9
1961-65	3950	1597	40.4	1147	440	38.4	5097	2037	40.0
1966-70	4196	1475	35.2	1183	385	32.5	5379	1860	34.6
1971-75	4303	785	18.2	1150	238	20.7	5453	1023	18.8
1961	793	282	35.6	219	62	28.3	1012	344	34.0
62	788	354	44.9	201	73	36.3	989	427	43.2
63	782	349	44.6	212	97	45.8	994	446	44.9
64	767	303	39.5	226	95	42.0	993	398	40.1
65	820	309	37.7	289	113	39.1	1109	422	38.1
66	842	314	37.3	226	96	42.5	1068	410	38.4
67	767	282	36.8	239	74	31.0	1006	356	35.4
68	785	274	34.9	247	79	32.0	1032	353	34.2
69	904	327	36.2	215	70	32.6	1119	397	35.5
70	898	278	31.0	256	66	25.8	1154	344	29.8
71	851	188	22.1	239	58	24.3	1090	246	22.6
72	777	160	20.6	226	49	21.7	1003	209	20.8
73	903	170	18.8	235	53	22.6	1138	223	19.6
74	871	137	15.7	225	44	19.6	1096	181	16.5
75	901	130	14.4	225	34	15.1	1126	164	14.6

TABLE 2 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY YEAR OF DEATH, PLACE OF AUTOPSY, AND CITY, 1961-75

表2 寿命調査集団における剖検数及び剖検率；死亡年度，剖検場所及び都市別，1961－75年

Year of death	Hiroshima				Nagasaki			
	RERF		Other		RERF		Other	
	Autopsies	% of deaths	Autopsies	% of deaths	Autopsies	% of deaths	Autopsies	% of deaths
Total	3239	26.0	618	5.0	757	21.8	306	8.8
1961-62	587	37.1	49	3.1	106	25.2	29	6.9
1963	308	39.4	41	5.2	79	37.3	18	8.5
64	266	34.7	37	4.8	73	32.3	22	9.7
65	270	32.9	39	4.8	83	28.7	30	10.4
66	273	32.4	41	4.9	71	31.4	25	11.1
67	237	30.9	45	5.9	50	20.9	24	10.0
68	216	27.5	58	7.4	48	19.4	31	12.6
69	253	28.0	74	8.2	54	25.1	16	7.4
70	208	23.2	70	7.8	48	18.8	18	7.0
71	143	16.8	45	5.3	35	14.6	23	9.6
72	131	16.9	29	3.7	39	17.3	10	4.4
73	127	14.1	43	4.8	27	11.5	26	11.1
74	116	13.3	21	2.4	28	12.4	16	7.1
75	104	11.5	26	2.9	16	7.1	18	8.0

Nagasaki, non-RERF autopsies all through the period 1961-75 have been a larger proportion of total autopsies than in Hiroshima; for 1971-75, this figure for Nagasaki was 39%. The percent of all Nagasaki deaths with non-RERF autopsies has been variable, but, on the whole, this figure has not declined as much as RERF autopsy rates in that city. This may be related to the fact that from 1961-75 a larger proportion of deaths in the LSS sample occurred in hospitals in Nagasaki (44%), compared with Hiroshima (39%). Hospital deaths had increased in both cities in 1971-75, reaching 51% in Nagasaki and 46% in Hiroshima. The autopsy rate for the LSS deaths in hospital depended on the frequency of autopsy in the hospital, since generally, the hospital staff or the attending physician may not have been aware of the decedent's selection for the LSS sample.

Exposure Dose

RERF Pathology Studies Report 3 noted the direct relationship between the tentative 1965 radiation dose (T65D)[5] and autopsy rate in Hiroshima. In Nagasaki, while there was a trend towards higher autopsy rates with greater T65 doses, it was not completely consistent. In the period 1971-75, the sharp decline in procurement rates affected all exposure groups; but the

獲得数は減少した．長崎の場合，1961－75年の全期間の総剖検数に対する放影研以外での剖検数は広島の場合よりも多く，その率は39%であった．長崎の全死亡例に対する放影研以外での剖検率は変動的であるが，概して，この率は同市の放影研での剖検率ほど低下していない．これは，1961－75年間の寿命調査中の病院死亡の割合が広島（39%）より長崎（44%）で高かったという事実に関係があるものと思われる．1971－75年間に両市の病院死亡例は増加し，その間の病院死亡率は長崎で51%，広島で46%に達した．寿命調査集団中の病院死亡例の剖検率は，その症例が寿命調査集団に属しているか否かについて病院や主治医側では予知していないため，各病院における剖検率によって左右された．

被曝線量

広島において1965年暫定推定放射線量（T65D）[5]と剖検率とが直接関係していることは，放影研病理学的調査第3報において指摘されたところである．長崎では，T65線量の増加につれて剖検率が上昇する傾向があったが，その関係は完全に一致したものではなかった．1971－75年間には，全被曝線量群で急激な剖検入手率の低下が認められたが，第3報で観察さ

FIGURE 2 AUTOPSY RATE IN LSS SAMPLE BY RADIATION DOSE
HIROSHIMA & NAGASAKI, 1961-75

図2　寿命調査集団における剖検率；放射線量別，広島・長崎，1961－75年

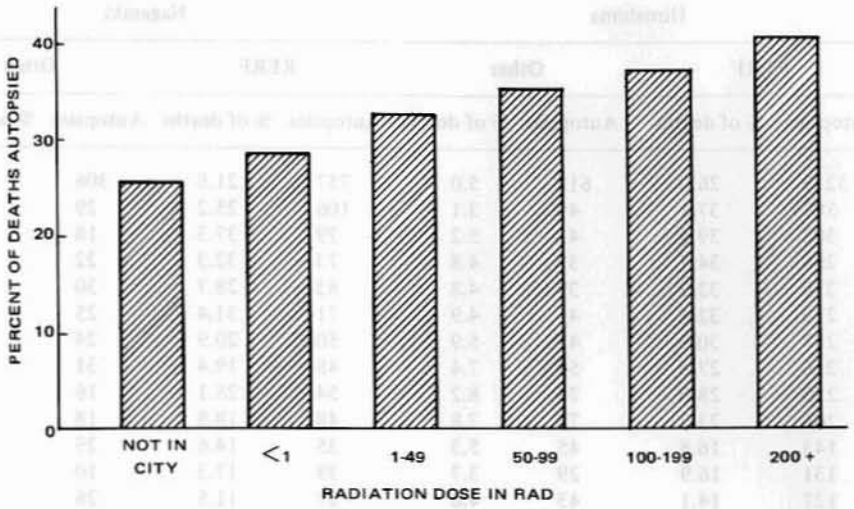


TABLE 3 NUMBER OF LSS DEATHS AND PERCENT AUTOPSIED BY PERIOD OF DEATH, RADIATION DOSE, AND CITY, 1961-75

表3　寿命調査集団における死亡数及び剖検率；死亡期間，放射線量及び都市別，1961－75年

Year	T65 Dose in rad	Hiroshima			Nagasaki		
		Deaths*	Autopsies	% of deaths	Deaths*	Autopsies	% of deaths
1961-65	Total	3950	1597	40.4	1147	440	38.4
	NIC	963	337	35.0	284	102	35.9
	<1	1472	549	37.3	200	72	36.0
	1-49	1146	527	46.0	469	182	38.8
	50-99	183	85	46.4	61	26	42.6
	100-199	82	46	56.1	52	19	36.5
	200+	72	41	56.9	49	25	51.0
1966-70	Total	4196	1475	35.2	1183	385	32.5
	NIC	1124	345	30.7	298	74	24.8
	<1	1578	540	34.2	200	74	37.0
	1-49	1148	437	38.1	478	158	33.1
	50-99	127	48	37.8	68	28	41.2
	100-199	93	38	40.9	45	20	44.4
	200+	87	46	52.9	63	23	36.5
1971-75	Total	4303	785	18.2	1150	238	20.7
	NIC	1134	177	15.6	252	40	15.9
	<1	1668	277	16.6	219	42	19.2
	1-49	1129	235	20.8	476	105	22.1
	50-99	142	34	23.9	60	15	25.0
	100-199	93	24	25.8	64	16	25.0
	200+	93	28	30.1	51	11	21.6

*Excludes 206 deaths with dose unknown (1961-65 H32, N32; 1966-70 H39, N31; and 1971-75 H44, N28).
線量不明の206例を除く（1961－65年広島32，長崎32；1966－70年広島39，長崎31；1971－75年広島44，長崎28）

TABLE 4 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY SEX, CITY, AND AGE AT DEATH, 1961-75

表4　寿命調査集団における剖検数及び剖検率；性，都市及び死亡年齢別，1961－75年

Age at death	Total			Male			Female		
	Deaths	Autopsies	% of deaths	Deaths	Autopsies	% of deaths	Deaths	Autopsies	% of deaths
Both cities									
Total	15929	4920	30.9	7900	2524	31.9	8029	2396	29.8
<20 years	16	5	31.3	11	5	45.5	5	-	-
20-29	210	52	24.8	137	33	24.1	73	19	26.0
30-39	544	162	29.8	311	97	31.2	233	65	27.9
40-49	788	232	29.4	378	115	30.4	410	117	28.5
50-59	1429	475	33.2	676	232	34.3	753	243	32.3
60-69	3648	1238	33.9	2046	724	35.4	1602	514	32.1
70-79	5484	1714	31.3	2855	901	31.6	2629	813	30.9
80+	3810	1042	27.3	1486	417	28.1	2324	625	26.9
Hiroshima									
Total	12449	3857	31.0	6016	1927	32.0	6433	1930	30.0
<20 years	9	1	11.1	6	1	16.7	3	-	-
20-29	145	30	20.7	97	21	21.6	48	9	18.8
30-39	354	101	28.5	201	62	30.8	153	39	25.5
40-49	538	156	29.0	257	77	30.0	281	79	28.1
50-59	1073	364	33.9	497	174	35.0	576	190	33.0
60-69	2825	950	33.6	1527	534	35.0	1298	416	32.0
70-79	4299	1355	31.5	2189	695	31.7	2110	660	31.3
80+	3206	900	28.1	1242	363	29.2	1964	537	27.3
Nagasaki									
Total	3480	1063	30.5	1884	597	31.7	1596	466	29.2
<20 years	7	4	57.1	5	4	80.0	2	-	-
20-29	65	22	33.8	40	12	30.0	25	10	40.0
30-39	190	61	32.1	110	35	31.8	80	26	32.5
40-49	250	76	30.4	121	38	31.4	129	38	29.5
50-59	356	111	31.2	179	58	32.4	177	53	29.9
60-69	823	288	35.0	519	190	36.6	304	98	32.2
70-79	1185	359	30.3	666	206	30.9	519	153	29.5
80+	604	142	23.5	244	54	22.1	360	88	24.4

relationships observed in Report 3 remained (Table 3 and Figure 2). Procurement in Hiroshima increased with increasing dose. In Nagasaki, the pattern observed for 1966-70 was repeated and, again, for 1971-75 there was a relatively low procurement rate for the 200 rad or more group compared with rates at smaller doses, the latter increased with increased dose.

れた関係は存続していた（表3及び図2）．広島では，線量の増加に伴って，剖検入手率が増加した．長崎では，1966－70年間に観察された傾向が再び認められたが，1971－75年では，200rad 以上の群の剖検入手率は低線量群のそれよりも低率であった．低線量群では線量の増加に従って剖検入手率が増加を示した．

Sex and Age

The autopsy procurement rate was slightly higher for males than for females (Table 4) but the difference was small (31.9% vs 29.8%). This was true in both cities for the period 1961-75 as a whole. For the years 1971-75 however, the gap

性及び年齢

剖検入手率は，女性よりも男性の方がやや高いが（表4），その差はわずかであった（31.9%対29.8%）．1961－75年を通してみると，この差は両市でほぼ同じであったが，1966－70年以来女性の剖検率が低下した結果（表5），1971－75年間に広島の剖検率にお

TABLE 5 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY CITY, SEX, AGE AT DEATH, AND PERIOD OF DEATH, 1961-75

表5　寿命調査集団における剖検数及び剖検率；都市，性，死亡年齢及び死亡期間別，1961－75年

Age at death	1961-65			1966-70			1971-75			Total (1961-75)		
	Deaths	Autopsies	%	Deaths	Autopsies	%	Deaths	Autopsies	%	Deaths	Autopsies	%
Both cities												
Total	5097	2037	40.0	5379	1860	34.6	5453	1023	18.8	15929	4920	30.9
Male	2631	1067	40.6	2710	945	34.9	2559	512	20.0	7900	2524	32.0
Female	2466	970	39.3	2669	915	34.3	2894	511	17.7	8029	2396	29.8
<50 years	587	217	37.0	496	165	33.3	475	69	14.5	1558	451	28.9
50-59	593	247	41.7	472	157	33.3	364	71	19.5	1429	475	33.2
60-69	1299	568	43.7	1342	485	36.1	1007	185	18.4	3648	1238	33.9
70-79	1644	630	38.3	1817	669	36.8	2023	415	20.5	5484	1714	31.3
80+	974	375	38.5	1252	384	30.7	1584	283	17.9	3810	1042	27.3
Hiroshima												
Total	3950	1597	40.4	4196	1475	35.2	4303	785	18.2	12449	3857	31.0
Male	2006	813	40.5	2049	720	35.1	1961	394	20.1	6016	1927	32.0
Female	1944	784	40.3	2147	755	35.2	2342	391	16.7	6433	1930	30.0
<50 years	401	137	34.2	323	114	35.3	322	37	11.5	1046	288	27.5
50-59	437	190	43.5	355	118	33.2	281	56	19.9	1073	364	33.9
60-69	990	429	43.3	1032	385	37.3	803	136	16.9	2825	950	33.6
70-79	1301	504	38.7	1423	532	37.4	1575	319	20.3	4299	1355	31.5
80+	821	337	41.0	1063	326	30.7	1322	237	17.9	3206	900	28.1
Nagasaki												
Total	1147	440	38.4	1183	385	32.5	1150	238	20.7	3480	1063	30.5
Male	625	254	40.6	661	225	34.0	598	118	19.7	1884	597	31.7
Female	522	186	35.6	522	160	30.7	552	120	21.7	1596	466	29.2
<50 years	186	80	43.0	173	51	29.5	153	32	20.9	512	163	31.8
50-59	156	57	36.5	117	39	33.3	83	15	18.1	356	111	31.2
60-69	309	139	45.0	310	100	32.3	204	49	24.0	823	288	35.0
70-79	343	126	36.7	394	137	34.8	448	96	21.4	1185	359	30.3
80+	153	38	24.8	189	58	30.7	262	46	17.6	604	142	23.5

in autopsy rates by sex for Hiroshima (20.1% vs 16.7%) had widened as a result of the larger decline in rates for females since the 1966-70 period (Table 5). In Nagasaki, the decline in rate from 1966-70 to 1971-75 was greater for males, bringing the autopsy rate for males in this last period (19.7%) below that for females (21.7%).

Except for the low autopsy procurement rate for persons who died under age 50 in Hiroshima, and at ages 80 or older in Nagasaki, there is no evidence that age at death significantly influenced the procurement rates (Table 5). Owing to the age distribution of deaths, however, more than half the autopsy subjects are 70 years or older.

ける性差（20.1%対16.7%）は広がった．長崎では，1966－70年から1971－75年にかけての剖検率の低下率は男性の方が大きく，1971－75年の期間における男性の剖検率（19.7%）は女性のそれ（21.7%）を下回った．

広島の50歳未満の死亡例と長崎の80歳以上の死亡例の剖検入手率が低いことを除いて，死亡年齢が入手率に有意な影響を与えたという証拠はない（表5）．しかしながら，死亡年齢分布をみると，剖検例の半分以上は70歳以上である．

TABLE 6 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY CITY, PLACE OF DEATH, AND PERIOD OF DEATH, 1961-75

表6　寿命調査集団における剖検数及び剖検率；都市，死亡場所及び死亡期間別，1961－75年

Place of death	Hiroshima		Nagasaki		Total	
	Autopsies	% of deaths	Autopsies	% of deaths	Autopsies	% of deaths
			Total (1961-75)			
Total	3857	31.0	1063	30.5	4920	30.9
Hospital	1831	37.4	656	43.3	2487	38.8
Clinic	138	28.6	40	22.5	178	27.0
Home	1888	26.7	367	20.5	2255	25.5
			1961-65			
Total	1597	40.4	440	38.4	2037	40.0
Hospital	620	50.4	218	57.7	838	52.1
Clinic	36	49.3	15	29.4	51	41.1
Home	941	35.6	207	28.8	1148	34.1
			1966-70			
Total	1475	35.2	385	32.5	1860	34.6
Hospital	771	45.3	252	45.9	1023	45.4
Clinic	58	33.9	15	23.8	73	31.2
Home	646	27.8	118	20.7	764	26.4
			1971-75			
Total	785	18.2	238	20.7	1023	18.8
Hospital	440	22.4	186	31.6	626	24.5
Clinic	44	18.5	10	15.6	54	17.9
Home	301	14.3	42	8.5	343	13.2

Place and Cause of Death

There is little question that autopsy procurement is simpler and more likely to be successful when death occurs in a hospital. In the years 1961-75, 39% of LSS hospital deaths were autopsied (Table 6). The corresponding proportions were 27% for clinic deaths and 26% for deaths occurring in other places, mostly at home. While the percent of deaths autopsied differed little for deaths at home or in a clinic, the levels varied somewhat by city. For Hiroshima, the autopsy rate was 29% for deaths in clinics and 27% for deaths at home; while for Nagasaki, the figures were 23% and 21%, respectively. This experience was reversed for hospital deaths. The hospital autopsy rate was 43% for Nagasaki contrasted with 37% for Hiroshima.

The drop in autopsy rates in the three periods shown in Table 6 varied both by place of death and by city. In Hiroshima, the decline in rate between 1961-65 and 1966-70 was greater for

死亡場所及び死因

病院死亡例の場合，他の場所よりも剖検入手が簡単で，成功率が高いことはほぼ疑いない．1961－75年間では，寿命調査集団中の病院死亡例の39%が剖検を受けた（表6）．医院死亡例の場合27%，その他の場所，主に自宅での死亡例の場合26%が剖検を受けた．剖検率は，自宅死亡例も医院死亡例もほぼ差はなかったが，都市別にみるとやや異なっていた．広島の場合，医院死亡例の剖検率は29%，自宅死亡例は27%で，長崎の場合はそれぞれ23%と21%であった．病院死亡例の場合，両市の剖検率の高低は反対となり，広島の37%に対し長崎は43%であった．

表6に示すように，3期間における剖検率の低下は死亡場所によっても都市によっても異なる．広島では，1961－65年間から1966－70年間にかけての剖検率の低下率は医院の方が大きかったが，長崎では自宅

clinics; in Nagasaki the autopsy rate for deaths at home showed the largest decrease. In the next period, 1971-75, the declines in rates were similar for all places of death in Hiroshima, but in Nagasaki, it was far greater for deaths at home than for deaths in hospital or in clinic. As a result of these differences, by 1971-75, the hospital autopsy rate for Nagasaki exceeded that for Hiroshima, but rates for both clinic and home deaths fell below those for the Hiroshima.

Bias in selection of deaths for autopsy by cause arises from the factors associated with the nature of the terminal illness. Patients with certain illnesses are more frequently cared for in the hospital, permitting their deaths to be subject to hospital autopsy rates. In the LSS sample, for example, deaths from malignancies (ICD 140-203, 208, 209) represent 21% of all deaths, but 27% of all autopsies. This figure results in part because two-thirds of the 3,330 deaths from malignancies occurred in hospital and were subject to the higher autopsy rate for persons dying in hospital. For almost every site shown in Table 7, both the number of deaths in hospital and the autopsy rates were higher than for deaths at home. Besides malignancies, the most frequent causes of deaths in hospital were cerebrovascular and cardiovascular diseases. Among the deaths at home, a larger proportion than in hospital were assigned to cerebrovascular and cardiovascular diseases and to ill-defined causes, but a much smaller proportion to malignancies.

Place of Residence

Permission for autopsy is obtained more often when death takes place in the city. In both cities population migration has resulted in an increase in survivors dying outside the city. This increase is small for Hiroshima, and slightly larger for Nagasaki (Table 8). The autopsy rates in both cities have been quite low for deaths outside the city and have dropped along with the autopsy rates for deaths in the city. While migration cannot account for the decreasing autopsy rate, it is an additional factor contributing to the decline.

Participation in the AHS

The AHS sample consists of two groups; a small group who, for various reasons including noncooperation, were never examined (AHS/unexamined), and a large group who were examined one or more times. The autopsy rates

死亡例の剖検率が最大の低下率を示した．次の1971－75年間の剖検率低下をみると，広島の場合，死亡場所による差はほとんどなかったが，長崎では，病院又は医院死亡例よりも自宅死亡例の方の低下率が大きかった．このような差の結果として，1971－75年間までの病院死亡例の剖検率は広島より長崎の方が高く，医院及び自宅死亡例の剖検率は広島の方が高かった．

死因によって生じる剖検例の偏りは，末期疾患の性質に関連する要因に起因している．特定の疾患の患者は他の疾患の患者よりも病院で治療を受けることが多く，したがって，死亡した場合，病院で剖検を受ける率も高い．例えば，寿命調査集団中の悪性腫瘍（ICD 140-203,208,209）による死亡は全死亡例の21%であるが，その剖検例は全剖検例の27%である．この数字は，悪性腫瘍による死亡3,330例のうち３分の２が病院死亡で，病院死亡の剖検率は他より高いという事情を反映している．表７に示すようにほとんど全部の部位で，病院での死亡数並びに剖検率が自宅死亡例のそれよりも高かった．悪性腫瘍を除いて，病院死亡例中最も多い死因は脳血管障害及び心血管障害であった．自宅死亡の場合，脳血管障害，心血管障害及び診断不明確な死因の割合が病院死亡よりも大きく，悪性腫瘍の割合がはるかに小さかった．

居住地

市内で死亡が起こった場合の方が剖検承諾は得やすい．両市共人口移動のため市外で死亡する被爆者が多くなってきている．この増加傾向は広島では小さく，長崎では若干大きい（表８）．両市の市外死亡例の剖検率は極めて低く，市内死亡例の剖検率の低下と共に下降している．移動だけで剖検率の低下を説明することはできないが，移動が低下に関連する要因の一つであることは間違いない．

成人健康調査への参加状況

成人健康調査集団は，協力拒否を含めて何らかの理由で全く受診したことのない少数群（成人健康調査／非受診者）と，１回以上受診したことのある多数群の２群から成る．表９でこの２群の剖検率と残りの

TABLE 7 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY CAUSE AND PLACE OF DEATH, 1961-75

表7 寿命調査集団における剖検数及び剖検率；死因及び死亡場所別，1961－75年

ICD (8th Rev.)	Cause of death	Hospital		Clinic		Home		Total	
		Autopsies*	%	Autopsies*	%	Autopsies*	%	Autopsies*	%
Total	All causes	2487	38.8	178	27.0	2255	25.5	4920	30.9
010-019	Tuberculosis	123	41.4	3	23.1	50	31.3	176	37.4
204-207	Leukemia	35	53.0	4	100.0	3	50.0	42	55.3
140-203, 208-209	Malignant neoplasms, except leukemia	970	43.5	50	34.0	309	32.5	1329	39.9
	Malignant neoplasm of:								
150	esophagus	38	50.0	1	100.0	11	32.4	50	45.0
151	stomach	292	37.8	23	34.3	129	30.8	444	35.3
153	large intestine	37	39.4	-	-	6	24.0	43	34.4
154	rectum	29	39.2	-	-	16	37.2	45	36.3
155	liver & intrahepatic bile duct	8	44.4	1	100.0	-	-	9	45.0
157	pancreas	46	56.1	1	50.0	9	29.0	56	48.7
162	trachea, bronchus & lung	146	52.9	10	55.6	36	34.6	192	48.2
174	breast	30	53.6	-	-	10	55.6	40	51.3
180	cervix uteri	16	33.3	-	-	-	-	16	31.4
182	Other malignant neoplasm of uterus	31	35.6	4	50.0	18	29.5	53	34.0
250	Diabetes mellitus	36	42.4	2	18.2	29	22.1	67	29.5
430-438	Cerebrovascular diseases	319	33.2	40	31.3	677	25.3	1036	27.5
390-429	Cardiovascular diseases	295	37.9	19	20.7	388	22.4	702	27.0
480-486	Pneumonia	67	29.3	8	38.1	95	23.3	170	25.8
490-493	Bronchitis, emphysema, & asthma	36	46.2	2	15.4	59	25.4	97	30.0
531-533	Gastric, duodenal, & peptic ulcers	35	40.2	1	12.5	22	28.6	58	33.7
571	Cirrhosis of liver	106	41.4	6	20.7	41	30.1	153	36.3
580-584	Nephritis & nephrosis	31	35.2	1	20.0	30	25.4	62	29.4
780-796	Symptoms & ill-defined conditions	19	26.4	2	15.4	266	28.1	287	27.8
800-999	Accidents, poisonings, & violence	76	22.4	9	10.6	62	13.4	147	16.6
Remainder in 000-799	All other diseases & conditions	399	40.1	31	34.1	224	27.5	594	33.9

*Number autopsied by stated death certificate underlying cause. – Quantity zero
死亡診断書原死因別の剖検数. 計数なし.

TABLE 8 NUMBER OF LSS DEATHS AND PERCENT AUTOPSIED BY LOCATION AT DEATH, HIROSHIMA AND NAGASAKI, 1961-75

表8 寿命調査集団における死亡数及び剖検率；死亡場所別，広島・長崎，1961－75年

Period	Location at death			Autopsy rate	
	In city	Not in city	%	Deaths in city	Death Not in city
		Hiroshima			
1961-65	3440	510	12.9	44.7	11.4
1966-70	3558	638	15.2	39.9	8.9
1971-75	3634	669	15.5	20.4	6.4
		Nagasaki			
1961-65	1015	132	11.5	41.8	12.1
1966-70	968	215	18.2	36.8	13.5
1971-75	928	222	19.3	23.9	7.2

TABLE 9 NUMBER OF LSS DEATHS AND PERCENT AUTOPSIED BY PERIOD OF DEATH AND AHS PARTICIPATION, 1961-75

表9 寿命調査集団における死亡数及び剖検率；死亡期間及び成人健康調査への参加状態別，1961－75年

AHS participation	1961-65		1966-70		1971-75	
	Deaths	% autopsies	Deaths	% autopsies	Deaths	% autopsies
Total	5097	40.0	5379	34.6	5453	18.8
Not AHS sample	4178	38.1	4275	32.9	4307	17.1
AHS/examined	811	51.9	1032	43.3	1063	26.6
AHS/not examined	108	24.1	72	8.3	83	4.8

TABLE 10 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY RADIATION DOSE AND AHS PARTICIPATION, 1961-75

表10 寿命調査集団における剖検数及び剖検率；放射線量及び成人健康調査への参加状態別，1961－75年

T65 Dose in rad	Not AHS Sample			AHS/examined			AHS/unexamined			Total*		
	Deaths	Autop-sies	%	Deaths	Autop-sies	%	Deaths	Autop-sies	%	Deaths	Autop-sies	%
Total	12630	3693	29.2	2844	1118	39.3	249	35	14.1	15723	4846	30.8
NIC	3294	822	25.0	672	246	36.6	89	7	7.9	4055	1075	26.5
<1	4580	1304	28.5	693	245	35.4	64	5	7.8	5337	1554	29.1
1-49	4151	1353	32.6	656	283	43.1	39	8	20.5	4846	1644	33.9
50-99	368	128	34.8	263	106	40.3	10	2	20.0	641	236	36.8
100-199	159	54	34.0	242	101	41.7	28	8	28.6	429	163	38.0
200+	78	32	41.0	318	137	43.1	19	5	26.3	415	174	41.9

*Excludes 206 deaths with dose unknown, of which 74 were autopsied. 線量不明の死亡者206名（剖検74例を含む）を除く．

for these two groups are compared with the rates for the balance of the LSS population (not AHS) in Table 9. The autopsy procurement rates for those participating in the biennial examination (AHS/examined) are higher in 1961-65 and 1966-70 than for the other two groups. With the decline of procurement rates to 19% in 1971-75, the figure for the AHS/examined group remained substantially above that for the two unexamined groups.

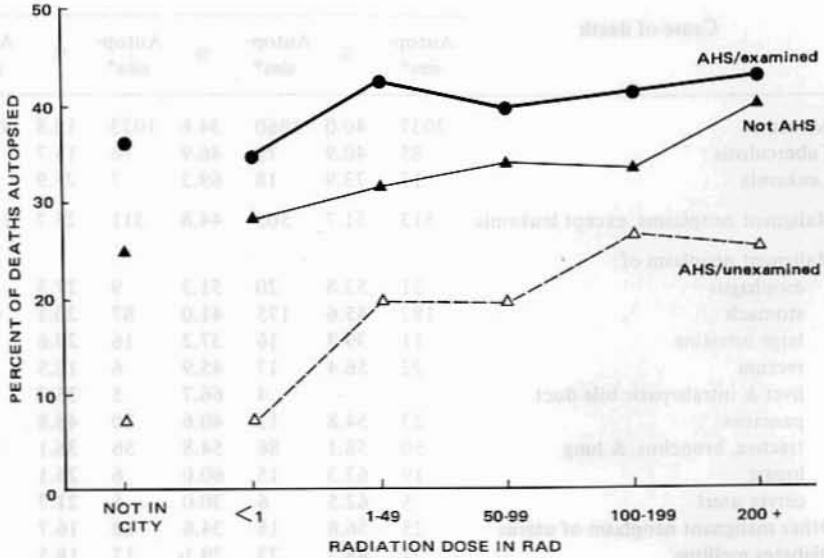
When the autopsy rates for the same three groups were tabulated by T65 dose, an additional factor emerges in the high autopsy rate for the AHS/examined group (Table 10). The autopsy rates for the total and in the not AHS and the AHS/unexamined groups generally increased with increasing radiation dose. In the AHS/examined population, the autopsy rate is about the same in all exposure groups and slightly lower for the NIC and under 1 rad group. While at each dose level, the autopsy rate for the AHS/examined

寿命調査集団（非成人健康調査集団）のそれとを比較した．1961－65年間及び1966－70年間の2年ごとの検診受診者（成人健康調査／受診者）の剖検入手率は他の二つの群のそれよりも高い．1971－75年間に剖検入手率は19%まで下がったが，成人健康調査受診群の入手率は二つの非受診群のそれよりも高い状態が続いた．

上記の3群の剖検率をT65線量別に製表したところ，成人健康調査受診群の高率に関係をもつ要因が更に一つ認められた（表10）．全体の剖検率，成人健康調査集団以外の剖検率，並びに成人健康調査非受診者の剖検率は一般に放射線量の増加に従って増加した．成人健康調査受診者の場合，剖検率は全線量群ともほぼ同じであったが，市内不在者並びに1 rad未満の線量群の剖検率がやや低かった．各線量群とも，

FIGURE 3 AUTOPSY RATE IN LSS SAMPLE BY AHS PARTICIPATION & RADIATION DOSE, HIROSHIMA & NAGASAKI, 1961-75

図3　寿命調査集団における剖検率；成人健康調査への参加状態及び放射線量別，広島・長崎，1961－75年



group was higher than for the remaining groups, the differences were statistically significant only below 50 rad. The greater proportion of persons in the AHS/examined group at higher doses, and the consistently higher autopsy rates of the AHS/examined population combined to produce the higher autopsy rate for the total of this population (Figure 3).

成人健康調査受診群の方が他の群よりも剖検率が高かったが，その差が統計的に有意であったのは50rad未満群のみであった．成人健康調査受診群には高線量被曝者が比較的多いことと成人健康調査集団の剖検率が一貫して高いことが結びついて，この集団全体の剖検率が高率となった（図3）．

Trend in Autopsy Rates by Cause of Death

The sharp decline in autopsy rates over the years 1961-75 affected almost every cause of death shown in Table 11, but not to the same extent. Only a small drop in rate occurred for deaths from ulcers and from nephritis and nephrosis so that in 1971-75, except for specified cancer sites, the highest autopsy rate by cause was recorded for deaths in which the underlying cause was assigned to ulcers (30%) followed closely by the rate for nephritis and nephrosis, leukemia, and the total for malignancies other than leukemia. Within the latter group, rates are shown for each of ten sites of malignant neoplasms. The rise in the autopsy rate between 1966-70 and 1971-75 for deaths from malignant neoplasms of the pancreas was the only exception to the general decline by site.

死因別にみた剖検率の傾向

1961－75年間の急激な剖検率の低下によって，表11に示すように，ほとんどすべての死因に影響が及んだが，その程度は一律ではなかった．潰瘍，腎炎及び腎症による死亡者の剖検率の低下率がごくわずかであったため，特定の部位の癌を除くと，1971－75年間の死因別による剖検率は，原死因が潰瘍のものが最も高く（30%），続いて，腎炎及び腎症，白血病，並びに白血病を除く全悪性腫瘍の順となっていた．後群のうち，悪性腫瘍については10個所の部位を選び出し，それぞれの剖検率を示した．一般に，部位別の剖検率は下降したが，唯一の例外として，1966－70年間及び1971－75年間の膵臓の悪性腫瘍による死亡者の剖検率が上昇していた．

Cause of Death and Radiation Dose

The use of autopsy data in the assessment of

死因と放射線量

死因と放射線被曝との関係の評価に剖検資料を利用

TABLE 11 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY CAUSE OF DEATH FOR 1961-75
表11 寿命調査集団における剖検数及び剖検率；死因別，1961－75年

ICD (8th Rev.)	Cause of death	1961-65		1966-70		1971-75		Total (1961-75)	
		Autopsies*	%	Autopsies*	%	Autopsies*	%	Autopsies*	%
Total	All causes	2037	40.0	1860	34.6	1023	18.8	4920	30.9
010-019	Tuberculosis	85	40.9	75	46.9	16	15.7	176	37.4
204-207	Leukemia	17	73.9	18	69.2	7	25.9	42	55.3
140-203, 208-209	Malignant neoplasms, except leukemia	513	51.7	505	44.8	311	25.7	1329	39.9
	Malignant neoplasm of:								
150	esophagus	21	53.8	20	51.3	9	27.3	50	45.0
151	stomach	182	45.6	175	41.0	87	20.1	444	35.3
153	large intestine	11	39.3	16	37.2	16	29.6	43	34.4
154	rectum	22	56.4	17	45.9	6	12.5	45	36.3
155	liver & intrahepatic bile duct	-	-	4	66.7	5	35.7	9	45.0
157	pancreas	23	54.8	13	40.6	20	48.8	56	48.7
162	trachea, bronchus, & lung	50	58.1	86	54.8	56	36.1	192	48.2
174	breast	19	63.3	15	60.0	6	26.1	40	51.3
180	cervix uteri	5	62.5	6	30.0	5	21.7	16	31.4
182	Other malignant neoplasm of uterus	25	56.8	18	34.6	10	16.7	53	34.0
250	Diabetes mellitus	27	48.2	23	29.1	17	18.5	67	29.5
430-438	Cerebrovascular diseases	447	37.1	390	30.4	199	15.6	1036	27.5
390-429	Cardiovascular diseases	233	34.6	288	32.3	181	17.4	702	27.0
480-486	Pneumonia	71	35.7	59	28.2	40	16.0	170	25.8
490-493	Bronchitis, emphysema & asthma	38	33.6	37	33.6	22	22.0	97	30.0
531-533	Gastric, duodenal, & peptic ulcers	22	33.8	22	36.1	14	30.4	58	33.7
571	Cirrhosis of liver	54	51.4	63	42.3	36	21.6	153	36.3
580-584	Nephritis & nephrosis	23	29.1	23	32.4	16	26.2	62	29.4
780-796	Symptoms & ill-defined conditions	168	36.5	80	24.8	39	15.6	287	27.8
800-999	Accidents, poisonings, & violence	79	25.6	50	17.1	18	6.3	147	16.6
Remainder in 000-799	All other diseases & conditions	260	42.6	227	38.2	107	19.5	594	33.9

*Number autopsied with stated death certificate underlying cause.
死亡診断書原死因別の剖検数

the relationship of cause of death to radiation exposure depends on an unbiased selection of deaths for autopsy. However, autopsy procurement has been seen earlier (Figure 2) to be biased by radiation dose. Table 12 shows autopsy rates by dose and cause of death. In a few instances, the autopsy rate for the cause group is clearly biased with the rate increasing with increasing dose. This is true for tuberculosis, malignancies as a whole, and cerebrovascular disease. For the latter group, the autopsy rate shows a rise only for the 200 rad or more population. Other causes seem to show a tendency to higher autopsy rates with increasing radiation dose, but with the number in each cell quite small, it is not possible to be certain of bias. There is one clear exception: the autopsy

するためには，死亡例に対して剖検例に偏りがないことが大事である．しかしながら前にもみたように(図２)，剖検入手には放射線量による偏りがある．表12に線量及び死因別の剖検率を示した．若干の例では，死因群の剖検率が線量増加に伴って明らかに偏りをみせている．これには，結核，悪性腫瘍全般，及び脳血管障害がある．後群では，剖検率が上昇を示しているのは200rad 以上の集団のみである．その他の死因では，放射線量の増加に伴い剖検率が上昇する傾向があるようにみえるが，各項の数値が極めて小さいため，偏りを確かめることはできない．唯一の明白な例外は白血病である．白血病の剖検率は線量

TABLE 12 NUMBER AND PERCENT OF LSS DEATHS AUTOPSIED BY CAUSE OF DEATH AND RADIATION DOSE, 1961-75

表12 寿命調査集団における剖検数及び剖検率；死因及び放射線量別，1961－75年

ICD (8th Rev.)	Cause of death		T65 dose in rad						
			Total*	NIC	<1	1-49	50-99	100-199	200+
Total**	All causes	No.	4846	1075	1554	1644	236	163	174
		%	30.8	26.5	29.1	33.9	36.8	38.0	41.9
010-019	Tuberculosis	No.	171	44	51	49	9	7	11
		%	37.2	33.6	37.2	33.3	56.3	53.8	68.8
204-207	Leukemia	No.	39	7	9	13	1	2	7
		%	54.2	63.6	50.0	54.2	25.0	40.0	70.0
140-203, 208-209	Malignant neoplasms, except leukemia	No.	1307	319	400	423	60	51	54
		%	39.8	37.2	37.4	42.1	45.1	49.0	47.8
	Malignant neoplasm of:								
150	esophagus	No.	50	11	20	11	5	2	1
		%	45.0	40.7	45.5	44.0	71.4	66.7	20.0
151	stomach	No.	438	120	145	133	13	13	14
		%	35.3	35.3	33.4	37.0	34.2	41.9	35.0
153	large intestine	No.	43	9	10	15	3	5	1
		%	35.0	33.3	25.0	39.5	50.0	83.3	16.7
154	rectum	No.	44	14	11	17	-	1	1
		%	36.4	38.9	32.4	38.6	-	33.3	100.0
155	liver & intrahepatic bile duct	No.	9	-	3	6	-	-	-
		%	45.0	-	42.9	66.7	-	-	-
157	pancreas	No.	55	10	21	18	2	3	1
		%	48.7	45.5	46.7	50.0	66.7	100.0	25.0
162	trachea, bronchus, & lung	No.	186	39	49	66	9	9	14
		%	47.7	39.8	45.0	51.2	60.0	40.9	82.4
174	breast	No.	40	7	16	9	4	1	3
		%	52.6	38.9	59.3	42.9	66.7	100.0	100.0
180	cervix uteri	No.	16	3	2	9	1	1	-
		%	32.0	21.4	25.0	39.1	50.0	33.3	-
182	Other malignant neoplasm of uterus	No.	53	15	16	18	2	1	1
		%	34.2	34.9	34.0	32.7	50.0	25.0	50.0
250	Diabetes mellitus	No.	66	13	28	12	5	4	4
		%	29.6	25.5	30.4	22.2	35.7	80.0	57.1
430-438	Cerebrovascular diseases	No.	1025	207	334	377	45	28	34
		%	27.6	22.0	26.0	32.3	28.8	29.2	44.7
390-429	Cardiovascular diseases	No.	694	131	231	248	43	21	20
		%	26.9	21.4	25.6	29.8	37.4	36.2	34.5
480-486	Pneumonia	No.	167	34	56	56	12	5	4
		%	25.6	18.2	25.3	30.1	63.2	23.8	21.1
490-493	Bronchitis, emphysema, & asthma	No.	94	27	32	27	-	5	3
		%	29.5	32.5	27.8	27.3	-	41.7	60.0
531-533	Gastric, duodenal, & peptic ulcers	No.	56	10	14	23	3	5	1
		%	32.9	27.0	24.6	39.7	42.9	83.3	20.0
571	Cirrhosis of liver	No.	152	38	50	46	8	6	4
		%	36.6	36.9	33.6	39.3	50.0	40.0	26.7
580-584	Nephritis & nephrosis	No.	62	18	25	15	4	-	-
		%	30.4	29.0	31.6	31.3	36.4	-	-
780-796	Symptoms & ill-defined conditions	No.	283	75	90	95	9	8	6
		%	27.9	24.2	26.8	31.9	25.0	36.4	42.9
800-999	Accidents, poisonings, & violence	No.	145	31	55	47	8	3	1
		%	16.5	13.0	19.6	16.8	23.5	12.5	5.0
Remainder in 000-799	All other diseases & conditions	No.	585	121	179	213	29	18	25
		%	33.7	28.1	30.0	40.0	38.7	38.3	46.3

*Excludes 74 autopsied deaths with dose unknown. 線量不明の剖検74例を除く．

**Number autopsied with stated death certificate underlying cause. 死亡診断書原死因別の剖検数．

rate for leukemia does not show a significant variation with dose.

に伴う有意な変動を示していない．

COMPARISONS BETWEEN CLINICAL AND AUTOPSY DIAGNOSES

臨床診断と剖検診断の比較

Confirmation and Detection Rates

確認率及び発見率

The LSS makes use of the medical certification of the death certificate, completed by the attending physician. The cause of death used in the LSS analyses is the underlying cause, which is defined as the disease or condition that started the sequence of events leading to death. The concept of underlying cause of death is that used as the basis for official mortality statistics for which there is an internationally accepted procedure.[6]

寿命調査では，主治医が作成した死亡診断書の死因を利用している．寿命調査の解析に使用される死因は原死因で，これは，死亡を引き起こした疾病又は状態と定義されている．原死因の概念は，国際的に承認された方法[6]による公式死亡率統計の基盤として使用されているものである．

The pathologist, when completing the autopsy protocol, designates a principal disease which can be treated in analysis as the equivalent to the underlying cause of death. The problems inherent in selecting and using a single cause for both death certificates and the autopsy protocol have been fully discussed in Report 3.[4]

病理医は，剖検記録を作成する際に，解析時に原死因に相当するものとして扱われる主要疾患を明記する．死亡診断書及び剖検記録という二つの記録に一つの死因を選択し使用することに関する問題については第３報で十分考察されている．[4]

In comparing the death certificate cause of death, and that stated in the autopsy protocol, the latter diagnosis is treated as the "true cause". Agreements or disagreements between the two sources of information can be examined in the following terms:

死亡診断書の診断と剖検記録の診断を比較する場合には，後者の診断を「真因」として扱う．上記二つの情報源による診断の一致及び不一致を，下記のとおり，分析することができる：

Principal Autopsy Diagnosis	Underlying cause of death		Total
	Disease X	Other than disease X	
Disease X	a Confirmed	b False negative	a+b
Other than disease X	c False positive	d Absence of disease X confirmed	c+d
Total	a+c	b+d	a+b+c+d

Four possible outcomes are specified, two agreements (a & d) and two disagreements (b & c). The percentage of cases in which the underlying cause is confirmed by autopsy is called a confirmation rate, defined as 100a/(a+c). The complement of the confirmation rate, 100c/(a+c) is the false positive rate. Similarly, the rate of correspondence between the underlying cause of death and principal autopsy diagnosis is 100a/(a+b), termed the detection rate. Its complement, 100b/(a+b) is the false negative rate.

この表では，起こり得る四つの結果，すなわち，２種類の一致（ａ及びｄ）と２種類の不一致（ｂ及びｃ）を示した．原死因が剖検で確認された症例の百分率を確認率と呼び，100ａ／（ａ＋ｃ）と定義する．この確認率の補数，すなわち，100ｃ／（ａ＋ｃ）が誤診率である．同様に，原死因が主要剖検診断と対応する割合は100ａ／（ａ＋ｂ）で，これを発見率と呼ぶ．その補数100ｂ／（ａ＋ｂ）が見落とし率である．

In the LSS, the underlying cause stated on the death certificate is the only means of analysis for the total population. Its accuracy is therefore, a matter of some concern. This is measured by the confirmation rate which describes the proportion of deaths from a specified cause on the death certificate which agree with autopsy findings. The detection rate measures how often the cause specified at autopsy is also found on the death certificate. It provides a measure of another aspect of the accuracy of the physician's diagnosis, but cannot be used directly to adjust underlying cause findings.

寿命調査の場合，死亡診断書に記載された原死因が，全集団を解析するための唯一の方法である．したがって，その正確性が重要な問題となる．これは，死亡診断書の特定死因が剖検所見の死因と一致する比率，すなわち確認率によって求められる．発見率は，剖検で明らかにされた死因が死亡診断書に記載されている割合を示すものである．これは，臨床医の診断の正確性の一面を判定する基準となるが，これを直接原死因所見に適用することはできない．

The underlying causes of death shown in Table 13 are associated with a wide range of confirmation rates, illustrating the clinician's problems in determining the cause of death. He is frequently faced with a situation where there is little information available to him about the medical history of the deceased, whereas the pathologist at autopsy is usually able to find some kind of pathology. In addition to the difference in information available, a further constraint is placed on the comparison of the clinician's diagnosis on the death certificate with the pathologist's autopsy diagnosis in that the International Classification of Disease (ICD) does not always suit the pathologist's needs. The pathologist often cannot find autopsy evidence for symptomatic disease, psychoses, acute and ill-defined conditions, etc., and cannot find diagnostic codes for some of his specific diagnoses including those which are not likely to be recognized by clinicians.

表13に示した原死因の確認率はその幅が広く，死因を決定する際の臨床医の問題を明らかにしている．臨床医が死亡者の医療歴に関してほとんど情報を得られないという事態に直面することはしばしばあるが，病理医が剖検を行えば，たいていある種の病変を発見することができる．入手情報が異なるばかりでなく，国際疾病分類（ICD）が病理医の必要に必ずしも一致しないことも，死亡診断書における臨床医の診断と剖検記録における病理医の診断との比較に制約を加えている．病理医が剖検で症候性疾患，精神症，急性もしくは診断不明確な状態などの形跡を検出できないことはよくあることで，また，臨床医によって発見される可能性の少ない疾病を含めて病理医独自の診断のための診断コードが見当たらないこともある．

A summary of the rates shown in Table 13 is presented in the following table in which the causes of death have been regrouped according to the level of confirmation and detection rates:

表13に示した確認率と発見率の値に従って死因群を再編成し，次表のようにまとめた．

Group	% of all deaths
1. Confirmation and detection rates both more than 40%	32
2. Confirmation and detection rates both 40% or less	44
3. Confirmation rate 40% or less, but detection rate more than 40%	12
4. Confirmation rate more than 40%, but detection rate 40% or less	5

The remainder, all other diseases and conditions, has been omitted.
表13に示したもの以外の疾病及び状態はすべて省略した．

The first group contains only three causes other than malignancies; accidents, tuberculosis, and

第1群に含まれる悪性腫瘍以外の死因は，事故，結核

TABLE 13 AUTOPSIED LSS DEATHS BY CAUSE ACCORDING TO DEATH CERTIFICATES AND ACCORDING TO AUTOPSY REPORTS, AND RATES OF CONFIRMATION AND DETECTION, 1961-75

表13 寿命調査集団における死亡診断書及び剖検記録の死因別剖検数，並びに確認率と発見率，1961－75年

ICD (8th Rev.)	Cause of death	Death certificate*	Autopsy report**	Agreement	Confirmation rate	Detection rate
Total	All causes	4920	4920	...	...	...
010-019	Tuberculosis	176	226	110	62.5	48.7
090-097	Syphilis	11	18	3	27.3	16.7
000-009, 020-089, 098-136	Other infective & parasitic diseases	62	22	6	9.7	27.3
	Malignant neoplasm of:					
140-149	buccal cavity & pharynx	19	17	13	68.4	76.5
150	esophagus	50	53	36	72.0	67.9
151	stomach	444	495	374	84.2	75.6
153	large intestine	43	54	28	65.1	51.9
154	rectum	45	46	32	71.1	69.6
155-156	liver, gallbladder, & bile ducts	42	169	26	61.9	15.4
157	pancreas	56	81	36	64.3	44.4
162	trachea, bronchus, lung	192	172	117	60.9	68.0
160-161, 163	other respiratory organs	31	125	22	71.0	17.6
174	breast	40	49	38	95.0	77.6
180-182	uterus	70	83	57	81.4	68.7
180	cervix uteri	16	64	14	87.5	21.9
181-182	chorionepithelioma & other neoplasm of uterus	54	19	12	22.2	63.2
183-184	other female genital organs	16	34	7	43.8	20.6
185	prostate	13	24	5	38.5	20.8
188-189	urinary organs	38	60	30	78.9	50.0
170-173, 190-195	other & unspecified sites	23	52	12	52.2	23.1
200-203	Malignant lymphomas	40	56	31	77.5	55.4
204-207	Leukemias	42	40	36	85.7	90.0
Remainder in 140-207	All other malignant neoplasms	166	29	8	4.8	27.6
210-239	Benign neoplasms & neoplasms of unspecified nature	65	21	3	4.6	14.3
250	Diabetes mellitus	67	38	22	32.8	57.9
280-289	Diseases of blood & blood-forming organs	30	14	12	40.0	85.7
390-398	Rheumatic fever & rheumatic heart disease	37	76	17	45.9	22.4
400-404	Hypertensive disease	188	318	43	22.9	13.5
410-414	Ischemic heart disease	265	199	67	25.3	33.7
420-429	Other forms of heart disease	212	126	30	14.2	23.8
430	Subarachnoid hemorrhage	38	71	18	47.4	25.4
431	Cerebral hemorrhage	473	158	85	18.0	53.8
433,434 437	Thrombo-embolic diseases	230	345	55	23.9	15.9
432,435, 436,438	Other cerebrovascular disease	295	54	12	4.1	22.2
440-447	Diseases of arteries	31	361	9	29.0	2.5
480-486	Pneumonia	170	180	31	18.2	17.2
490-493	Bronchitis, emphysema, & asthma	97	108	33	34.0	30.6
531-533	Gastric, duodenal, & peptic ulcer	58	61	24	41.4	39.3
550-553, 560	Intestinal obstruction & hernia	23	15	5	21.7	33.3

... Category not applicable 不適応

→

ICD (8th Rev.)	Cause of death	Death certificate*	Autopsy report**	Agreement	Confirmation rate	Detection rate
571	Cirrhosis of liver	153	149	80	52.3	53.7
580-584	Nephritis & nephrosis	62	29	11	17.7	37.9
780-789	Symptoms referable to systems or organs	60	8	1	1.7	12.5
794	Senility	220	5	2	0.9	40.0
790-793, 795-796	Ill-defined diseases	8	31	-	-	-
800-999	Accidents, poisonings, & violence	147	151	111	75.5	73.5
Remainder in 000-799	All other diseases & conditions	372	497	136	36.6	27.4

*Number with this underlying cause of death, who were autopsied. この原死因で剖検を受けた数.
**Number of autopsies with this principal autopsy diagnosis. この主要診断で剖検を受けた数.

cirrhosis of liver. The second group, the largest numerically, is dominated by cerebrovascular and cardiovascular diseases, symptoms, and senility. Symptoms, senility, and ill-defined diseases are causes recorded frequently on death certificates, but do not enter into autopsy reports. Only three cause-groups make up the class of diseases with low confirmation rates and high detection rates. Two of these are essentially clinical·diagnoses (diabetes mellitus and diseases of blood and blood-forming organs). The third, cerebral hemorrhage, is the most frequent cause of death shown in Table 13, in part because of special ICD rules for selecting this cause as the underlying cause, even when it was reported as the immediate cause, with another underlying cause. This practice was not followed by the pathologists.

The fourth group with relatively high confirmation rates but low detection rates includes only 5% of autopsied deaths. Several malignant sites for which clinical diagnosis is difficult, such as liver, gallbladder, and bile ducts, fall into this group.

The four groups of confirmation and detection rates by cause of death are shown below:

及び肝硬変の3死因だけである．数字の面では最も大きい第2群の死因は主に，脳血管障害，心血管障害，症候群及び老衰である．症候群，老衰及び診断不明確な疾病はよく死亡診断書に記録される死因であるが，剖検記録には登場しない．確認率が低く，発見率が高い第3群の死因は3種類だけである．そのうち2種類は本来臨床診断（糖尿病並びに血液及び造血器の疾患）である．3番目の脳出血は表13で最も多い死因であるが，その理由の一つには，脳出血が直接死因で原死因が別に記録されている場合にも，ICDの特別規則により脳出血が原死因として選ばれたという事情が挙げられる．病理医はこの慣例に従っていない．

確認率が比較的高く，発見率が低い第4群に属する剖検例は5％に過ぎない．肝臓，胆嚢及び胆管などの臨床診断の難しい部位の悪性腫瘍がこの群に入る．

4群の確認率及び発見率を次表のとおり死因別に列記した．

Cause of death and ICD number (8th revision)	Confirmation Rate	Detection Rate
1. Confirmation & detection rates both more than 40% 確認率及び発見率共40％以上		
Malignant neoplasm of breast (174) 乳房の悪性新生物	95.0	77.6

Cause of death and ICD number (8th revision)	Confirmation Rate	Detection Rate
Leukemias (204-207) 白血病	85.7	90.0
Malignant neoplasm of stomach (151) 胃の悪性新生物	84.2	75.6
Malignant neoplasm of uterus (180-182) 子宮の悪性新生物	81.4	68.7
Malignant neoplasm of urinary organs (188-189) 泌尿器の悪性新生物	78.9	50.0
Malignant lymphomas (200-203) 悪性リンパ腫	77.5	55.4
Accidents, poisonings, & violence (800-999) 不慮の事故，中毒及び外因死	75.5	73.5
Malignant neoplasm of esophagus (150) 食道の悪性新生物	72.0	67.9
Malignant neoplasm of rectum (154) 直腸の悪性新生物	71.1	69.6
Malignant neoplasm of buccal cavity & pharynx (140-149) 口腔及び咽頭の悪性新生物	68.4	76.5
Malignant neoplasm of large intestine (153) 大腸の悪性新生物	65.1	51.9
Malignant neoplasm of pancreas (157) 膵臓の悪性新生物	64.3	44.4
Tuberculosis (010-019) 結　核	62.5	48.7
Malignant neoplasm of trachea, bronchus, & lung (162) 気管，気管支及び肺の悪性新生物	60.9	68.0
Cirrhosis of liver (571) 肝硬変	52.3	53.7
2. Confirmation & detection rates both 40% or less **確認率及び発見率共40％以下**		
Malignant neoplasm of prostate (185) 前立腺の悪性新生物	38.5	20.8
Bronchitis, emphysema, & asthma (490-493) 気管支炎，肺気腫及び喘息	34.0	30.6
Diseases of arteries (440-447) 動脈の疾患	29.0	2.5

Cause of death and ICD number (8th revision)	Confirmation Rate	Detection Rate
Syphilis (090-097) 梅　毒	27.3	16.7
Ischemic heart disease (410-414) 虚血性心疾患	25.3	33.7
Thrombo-embolic diseases (433, 434, 437) 脳血栓塞栓症	23.9	15.9
Hypertensive disease (400-404) 高血圧性疾患	22.9	13.5
Intestinal obstruction & hernia (550-553, 560) 腸閉塞及びヘルニア	21.7	33.3
Pneumonia (480-486) 肺　炎	18.2	17.2
Nephritis & nephrosis (580-584) 腎炎及びネフローゼ	17.7	37.9
Other forms of heart disease (420-429) その他の心疾患	14.2	23.8
Other infective & parasitic diseases (000-009, 020-089,098-136) その他の伝染病及び寄生虫病	9.7	27.3
All other malignant neoplasms (remainder in 140-207) その他すべての悪性新生物(140－207の残り)	4.8	27.6
Benign neoplasms & neoplasms of unspecified nature (210-239) 良性新生物及び性質不詳の新生物	4.6	14.3
Other cerebrovascular disease (432, 435, 436, 438) その他の脳血管疾患	4.1	22.2
Symptoms referable to systems or organs (780-789) 系統又は器官に関する症状	1.7	12.5
Senility (794) 老　衰	0.9	40.0
3. Confirmation rate 40% or less but detection rate more than 40% 確認率40％以下，発見率40％以上		
Diseases of blood & blood-forming organs (280-289) 血液及び造血器の疾患	40.0	85.7
Diabetes mellitus (250) 糖尿病	32.8	57.9
Cerebral hemorrhage (431) 脳出血	18.0	53.8

Cause of death and ICD number (8th revision)	Confirmation Rate	Detection Rate
4. Confirmation rate more than 40% but detection rate 40% or less 確認率40%以上，発見率40%未満		
Malignant neoplasm of other respiratory organs (160-161, 163) その他の呼吸器系の悪性新生物	71.0	17.6
Malignant neoplasm of liver, gallbladder, & bile ducts (155-156) 肝臓，胆嚢及び胆管の悪性新生物	61.9	15.4
Malignant neoplasm of other & unspecified sites (170-173, 190-195) その他及び部位不明の悪性新生物	52.2	23.1
Subarachnoid hemorrhage (430) くも膜下出血	47.4	25.4
Rheumatic fever & rheumatic heart disease (390-398) リウマチ熱及びリウマチ性心疾患	45.9	22.4
Malignant neoplasm of other female genital organs (183-184) その他の女性性器の悪性新生物	43.8	20.6
Gastric, duodenal & peptic ulcer (531-533) 胃，十二指腸及び消化性潰瘍	41.4	39.3

As noted above, high confirmation rates are generally obtained for malignant neoplasms as the underlying cause of death. The highest rate (95%) was recorded for breast cancer (ICD 174). Confirmation rates for the death certificate diagnoses of leukemia, cancer of the stomach, and cervix uteri also ranked high (all over 80%). On the other hand, the confirmation rate for chorionepithelioma and other malignant neoplasms of the uterus (ICD 181, 182) is low, most likely the result of a lack of specificity of diagnostic information on death certificates. When cancer of the uterus (ICD 180-182) is considered as a whole, the confirmation rate is again high (Table 13).

Sites of malignant neoplasms with confirmation rates between 60% and 80% (urinary organs, lymphomas, esophagus, rectum, buccal cavity, pancreas, large intestine, lung, other respiratory organs, and liver) have detection rates over 40% except for other respiratory organs and liver, where the detection rates are 18% and 15% respectively. Clinical diagnosis for the sites with low detection rates is considerably more difficult than for cancer of the breast or leukemia.

上記のとおり，一般に原死因が悪性腫瘍の場合に確認率が高い．最も高率(95%)は乳癌(ICD 174)であった．死亡診断書の診断が白血病，胃癌，及び子宮頸部癌の場合の確認率も高かった(3死因とも80%以上)．それに反し，繊毛上皮腫及びその他の子宮の悪性新生物(ICD 181, 182)の確認率は低い．これは恐らく死亡診断書の死因の具体性が欠如していた結果であろう．しかし，子宮癌(ICD 180-182)全体をみると，確認率は高くなる(表13)．

確認率が60%から80%の悪性新生物の部位(泌尿器，リンパ腫，食道，直腸，口腔，膵臓，大腸，肺，その他の呼吸器，及び肝臓)は，その他の呼吸器及び肝臓の発見率がそれぞれ18%及び15%であるのを除いて，40%以上の発見率を示す．発見率の低い部位の臨床診断は乳癌や白血病の診断よりもかなり難しい．その

TABLE 14 AUTOPSIED LSS DEATHS FROM SELECTED SITES OF MALIGNANT NEOPLASMS ACCORDING TO AUTOPSY REPORTS BY CAUSE ACCORDING TO DEATH CERTIFICATES, 1961-75

表14　剖検記録記載の特定部位の悪性新生物による寿命調査集団死亡者の剖検数；死亡診断書記載の死因別，1961－75年

	Autopsy report*	Death certificate underlying cause** (ICD – 8th Rev.)																				
ICD (8th Rev.)	Cause of death	Total	140-149	150	151	153	154	155-156	157	162	160-161, 163	174	180-182	183-184	185	188-189	170-173, 190-195	200-203	204-207	Remainder in 140-207	Remainder in 000-999
	Malignant neoplasm of:																				
140-149	buccal cavity & pharynx	17	13	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	2	1
150	esophagus	53	-	36	3	-	-	-	1	1	1	-	-	-	-	-	-	1	-	1	9
151	stomach	495	-	7	374	1	2	2	3	2	-	-	-	2	-	-	-	1	-	23	78
153	large intestine	54	-	-	3	28	4	-	-	1	-	-	-	-	-	-	1	-	-	6	11
154	rectum	46	-	-	1	1	32	1	-	1	-	-	-	-	-	-	-	-	-	2	8
155-156	liver, gallbladder & bile ducts	169	-	-	13	1	-	26	9	1	-	-	-	-	-	-	1	-	-	63	55
157	pancreas	81	-	1	12	-	-	3	36	-	-	-	-	-	-	-	-	-	-	12	17
162	trachea, bronchus & lung	172	1	2	4	1	-	-	1	117	3	-	-	-	-	-	-	1	-	3	39
160-161, 163	other respiratory organs	125	3	-	-	-	1	-	-	47	22	-	1	-	1	-	1	-	-	5	44
174	breast	49	-	-	-	-	-	-	-	3	-	38	-	-	-	-	-	-	-	-	8
180-182	uterus	83	-	-	1	1	2	-	-	1	-	-	57	2	-	2	-	-	-	4	13
183-184	other female genital organs	34	-	-	3	2	1	-	1	-	-	-	7	7	-	-	1	-	-	5	7
185	prostate	24	-	-	1	-	-	-	-	3	-	-	-	-	5	1	-	-	-	-	14
188-189	urinary organs	60	-	-	1	2	-	-	-	1	-	-	2	1	2	30	1	1	-	2	17
170-173, 190-195	other & unspecified sites	52	1	-	-	-	1	-	-	3	5	1	-	-	1	-	12	1	-	6	21
200-203	Malignant lymphomas	56	-	-	1	-	1	-	1	-	-	1	-	1	-	-	-	31	2	5	13
204-207	Leukemias	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	36	-	2
Remainder in 140-207	All other malignant neoplasms	29	-	1	1	-	1	2	1	1	-	-	-	2	1	1	1	-	-	8	9
Remainder in 000-999	All causes other than malignant neoplasms	3281	1	3	26	6	-	8	3	10	-	-	3	1	3	4	4	2	4	19	3184
Total		4920	19	50	444	43	45	42	56	192	31	40	70	16	13	38	23	40	42	166	3550

*Number of autopsies with this principal autopsy diagnosis. この主要剖検診断による剖検数

**Number with this underlying cause of death, who were autopsied. この原死因で剖検を受けた数

Malignant neoplasms of other female genital organs and malignant neoplasm of prostate also fall into the group with low detection rates, but for these sites confirmation rates are low, 39% and 44% respectively.

The distribution by site for the malignant neoplasms as reported on the death certificate and in the autopsy report is shown in Table 14. In some cases, the cause of death was assigned to malignancies on both reports, with differences in site. The principal reason for disagreement seemed to be mistaking a peripheral organ of cancer for the primary site. But a number of deaths assigned to malignancies in one report were not so classified in the other. The total number of malignancies assigned on the basis of autopsy was 20% higher than the number based on the underlying cause.

There was far less agreement between clinician and pathologist for the cerebrovascular and cardiovascular diseases than for neoplasms. The ICD classification for these diseases is a mixture of clinical and pathological diagnoses. It also includes nonspecific diagnoses, since the ICD must provide a classification for every statement returned on the death certificate. Such a classification imposes constraints on the pathologist, but in all comparisons the ICD coded diagnoses were used for both reports. The distribution of death certificate reports of cerebral hemorrhage, and other cerebrovascular and cardiovascular diagnoses according to the autopsy report is shown in Table 15. The total deaths attributed to these diseases as a whole are almost the same from death certificates or from autopsy reports, but the numbers falling along the diagonal of the table are generally low. None of these causes was found in the group with high confirmation and detection rates; and many appeared in the group with confirmation and detection rates both 40% or less.

Comparisons by City, Sex, and AHS Participation

Variations in confirmation and detection rates depended almost entirely on the cause of death (Table 13). When selected causes of death were examined according to other variables, there were no consistent differences. By city, and by sex the rates for Hiroshima and Nagasaki showed no general patterns (Table 16). Except for leukemia and other malignancies, where confirmation rates were consistently high, there seemed to be some decline in rates with increasing age.

他女性性器の悪性新生物及び前立腺の悪性新生物も発見率の低い群に入るが，これらの部位の場合は確認率も低く，それぞれ39%及び44%である．

表14に死亡診断書並びに剖検記録に記録された悪性新生物の部位別分布を示した．両記録に示された死因が同じ悪性新生物であっても，その部位が異なる場合もあった．不一致の主な原因は，癌の原発臓器をその周辺の臓器癌と間違えたことにあるようである．しかし，悪性新生物と記録された死亡の多くが，他の報告ではそのように分類されていなかった．剖検に基づいて決定された悪性新生物の総数は原死因に基づく数よりも20%多かった．

悪性新生物に比べると，脳血管障害及び心血管障害の場合，臨床医と病理医の診断の一致例がはるかに少なかった．これらの疾患のICD分類は，臨床診断と病理診断の混じったものである．また，死亡診断書に報告されたあらゆる所見をICDによって分類しなければならないので，上記のICD分類には詳細不明の診断も含まれている．このような分類では病理医の診断に制限が加えられるが，比較のため，両記録にICDでコード化された診断が用いられた．剖検記録に記載された脳出血並びにその他の脳血管及び心血管障害の診断が死亡診断書ではどのように記録されているかを調べ，その分布状況を表15にまとめた．これらの疾患全体に起因する死亡総数は，死亡診断書でも剖検記録でもほぼ同じであったが，表の斜線に沿った数字は概して低かった．これらの死因のうち確認率及び発見率の高い群に属するものは全くなく，多くは，確認率及び発見率とも40%以下の群に属していた．

都市，性，及び成人健康調査への参加状態別の比較

確認率及び発見率の変動は，ほぼ完全に死因によって左右された(表13)．特定の死因をその他の変数に従って調べたが，一貫した差はなかった．広島・長崎の両率を都市及び性別に調べたところ，一般的なパターンは認められなかった(表16)．確認率が一貫して高かった白血病及びその他の悪性腫瘍を除けば年齢の上昇と共に確認率が幾らか下降していくよう

TABLE 15 AUTOPSIED LSS DEATHS FROM CEREBROVASCULAR AND CARDIOVASCULAR DISEASE, ACCORDING TO AUTOPSY REPORTS BY CAUSE ACCORDING TO DEATH CERTIFICATES, 1961-75

表15　剖検記録記載の脳血管障害及び心血管障害による寿命調査集団死亡者の剖検数；死亡診断書記載の死因別，1961－75年

	Autopsy report*	Death certificate underlying cause** (ICD 8th Rev.)												
ICD (8th Rev.)	Cause of death	Total	430	431	433 434 437	432 435 436 438	390-398	400-404	410-414	420-429	440	441-447	448-458	Remainder in 000-999
Total	All causes	4920	38	473	230	295	37	188	265	212	23	8	8	3143
430	Subarachnoid hemorrhage	71	18	31	2	5	-	2	3	1	-	-	-	9
431	Cerebral hemorrhage	158	12	85	9	25	-	2	2	4	-	-	-	19
433,434, 437	Thrombo-embolic diseases	344	2	77	55	68	1	23	24	17	-	-	-	77
432,435, 436,438	Other cerebrovascular disease	54	-	12	10	12	-	1	2	-	-	-	1	16
390-398	Rheumatic fever & rheumatic heart disease	76	-	2	2	2	17	4	8	18	-	-	-	23
400-404	Hypertensive disease	318	2	97	21	36	4	43	10	11	4	1	2	87
410-414	Ischemic heart disease	199	-	18	12	18	1	14	67	18	2	-	1	48
420-429	Other forms of heart disease	126	-	12	6	6	2	13	20	30	-	-	-	37
440	Arteriosclerosis	313	1	56	39	32	1	22	33	12	3	-	-	114
441-447	Other arterial disease	48	-	8	1	2	1	5	6	3	1	5	-	16
448-458	Other circulatory disease	16	-	3	1	-	-	-	-	-	-	-	1	11
Remainder in 000-999	All diseases other than cerebro-cardiovascular disease	3197	3	72	72	89	10	59	90	98	13	2	3	2686

*Number of autopsies with this principal autopsy diagnosis. この主要剖検診断による剖検数

**Number with this underlying cause of death, who were autopsied. この原死因で剖検を受けた数

TABLE 16 NUMBER OF AUTOPSIED LSS DEATHS CLASSIFIED BY CAUSE OF DEATH ACCORDING TO DEATH CERTIFICATE & AUTOPSY REPORT WITH CONFIRMATION AND DETECTION RATES, CITY, AND SEX, 1961-75

表16 寿命調査集団における剖検数；死亡診断書及び剖検記録記載の死因，確認率及び発見率並びに都市，及び性別，1961－75年

ICD (8th Rev.)	Cause of death	Death certificate*				Autopsy report**			
		Hiroshima		Nagasaki		Hiroshima		Nagasaki	
		Male	Female	Male	Female	Male	Female	Male	Female
Total	All causes	1927	1930	597	466	1927	1930	597	466
010-019	Tuberculosis	82	38	33	23	95	63	34	34
090-097	Syphilis	4	2	1	4	6	1	8	3
000-009, 020-089, 098-136	Other infective & parasitic diseases	26	23	6	7	6	8	4	4
	Malignant neoplasm of:								
150	esophagus	36	7	7	-	38	8	6	1
151	stomach	211	148	52	33	234	175	54	32
153	large intestine	17	15	7	4	20	24	8	2
154	rectum	12	19	6	8	17	14	7	8
155-156	liver, gallbladder, & bile ducts	9	18	9	6	62	53	31	23
157	pancreas	28	19	3	6	40	27	10	4
162	trachea, bronchus, & lung	84	62	34	12	84	45	32	11
174	breast	1	28	-	11	-	36	-	13
180	cervix	-	12	-	4	-	56	-	8
181-182	Chorionepithelioma & other neoplasm of uterus	-	50	-	4	-	14	-	5
200-203	Malignant lymphomas	16	10	6	8	19	18	12	7
204-207	Leukemias	13	13	7	9	11	12	6	11
Remainder in 140-209	All other malignant neoplasms	114	108	50	34	138	123	51	29
210-239	Benign neoplasms & neoplasms of unspec. nature	25	23	9	8	1	11	4	5
250	Diabetes mellitus	22	34	7	4	13	17	2	6
280-289	Diseases of blood & blood forming organs	6	16	4	4	2	6	3	3
390-398	Rheumatic fever & rheumatic heart disease	7	23	5	2	20	45	4	7
400-404	Hypertensive disease	67	74	23	24	106	129	45	38
410-414	Ischemic heart disease	103	110	27	25	94	73	16	16
420-429	Other forms of heart disease	69	102	17	24	44	48	19	15
430	Subarachnoid hemorrhage	10	21	5	2	18	41	4	8
431	Cerebral hemorrhage	190	183	61	39	63	59	23	13
433,434, 437	Thrombo-embolic disease	101	90	21	18	135	169	20	20
432,435, 436,438	Other cerebrovascular disease	114	124	37	20	7	17	19	11
440-447	Diseases of arteries	7	16	5	3	147	155	31	28
480-486	Pneumonia	54	83	21	12	64	73	28	15
490-493	Bronchitis, emphysema, & asthma	54	29	8	6	59	38	5	6
531-533	Gastric, duodenal, & peptic ulcer	26	21	8	3	28	20	9	4
550-553, 560	Intestinal obstruction & hernia	7	13	1	2	7	6	1	1
571	Cirrhosis of liver	79	37	25	12	71	43	23	12
580-584	Nephritis & nephrosis	23	29	4	6	10	12	3	4

*Number with this underlying cause of death, who were autopsied. この原死因で剖検を受けた数

**Number of autopsies with this principal diagnosis. この主要診断による剖検数

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TABLE 16 CONTINUED 表16 続き

ICD (8th Rev.)	Cause of death	Death certificate*				Autopsy report**			
		Hiroshima		Nagasaki		Hiroshima		Nagasaki	
		Male	Female	Male	Female	Male	Female	Male	Female
780-789	Symptoms referable to systems or organs	23	19	10	8	4	3	-	1
794	Senility	73	114	12	21	1	4	-	-
790-793, 795-796	Ill-defined diseases	2	3	3	-	13	13	4	1
800-999	Accidents, poisonings, & violence	70	49	18	10	73	52	20	6
Remainder in 000-799	All other diseases & conditions	142	145	45	40	177	219	51	51

ICD (8th Rev.)	Cause of death	Confirmation rate				Detection rate			
		Hiroshima		Nagasaki		Hiroshima		Nagasaki	
		Male	Female	Male	Female	Male	Female	Male	Female
010-019	Tuberculosis	64.6	57.9	57.6	69.6	55.8	34.9	55.9	47.1
090-097	Syphilis	25.0	-	100.0	25.0	16.7	-	12.5	33.3
000-009, 020-089, 098-136	Other infective & parasitic diseases	7.7	8.7	-	28.6	33.3	25.0	-	-
	Malignant neoplasm of:								
150	esophagus	75.0	57.1	71.4	-	71.1	50.0	83.3	-
151	stomach	82.9	86.5	86.5	78.8	74.8	73.1	83.3	81.3
153	large intestine	64.7	60.0	85.7	50.0	55.0	37.5	75.0	100.0
154	rectum	91.7	47.4	83.3	87.5	64.7	64.3	71.4	87.5
155-156	liver, gallbladder, & bile ducts	33.3	77.8	66.7	50.0	4.8	26.4	19.4	13.0
157	pancreas	64.3	68.4	100.0	33.3	45.0	48.1	30.0	50.0
162	trachea, bronchus, & lung	63.1	51.6	70.6	66.7	63.1	71.1	75.0	72.7
174	breast	-	96.4	-	100.0	-	75.0	-	84.6
180	cervix uteri	-	91.7	-	75.0	-	19.6	-	37.5
181-182	Chorionepithelioma, & other neoplasm of uterus	-	18.0	-	75.0	-	64.3	-	60.0
200-203	Malignant lymphomas	75.0	80.0	83.3	75.0	63.2	44.4	41.7	85.7
204-207	Leukemias	84.6	76.9	85.7	100.0	100.0	83.3	100.0	81.8
Remainder in 140-209	All other malignant neoplasms	47.4	45.4	44.0	47.1	39.1	39.8	43.1	55.2
210-239	Benign neoplasms, & neoplasms of unspec. nature	-	13.0	-	-	-	27.3	-	-
250	Diabetes mellitus	31.8	32.4	14.3	75.0	53.8	64.7	50.0	50.0
280-289	Diseases of blood, & blood forming organs	16.7	31.3	75.0	75.0	50.0	83.3	100.0	100.0
390-398	Rheumatic fever, & rheumatic heart disease	57.1	52.2	20.0	-	20.0	26.7	25.0	-
400-404	Hypertensive disease	16.4	20.3	43.5	29.2	10.4	11.6	22.2	18.4
410-414	Ischemic heart disease	29.1	22.7	25.9	20.0	31.9	34.2	43.8	31.3
420-429	Other forms of heart disease	13.0	12.7	17.6	20.8	20.5	27.1	15.8	33.3
430	Subarachnoid hemorrhage	30.0	52.4	40.0	100.0	16.7	26.8	50.0	25.0
431	Cerebral hemorrhage	18.4	15.3	21.3	23.1	55.6	47.5	56.5	69.2
433,434, 437	Thrombo-embolic disease	25.7	26.7	14.3	11.1	19.3	14.2	15.0	10.0
432,435, 436,438	Other cerebrovascular disease	0.9	4.0	16.2	-	14.3	29.4	31.6	-
440-447	Diseases of arteries	28.6	12.5	80.0	33.3	1.4	1.3	12.9	3.6
480-486	Pneumonia	13.0	16.9	33.3	25.0	10.9	19.2	25.0	20.0

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TABLE 16 CONTINUED 表16 続き

ICD (8th Rev.)	Cause of death	Confirmation rate				Detection rate			
		Hiroshima		Nagasaki		Hiroshima		Nagasaki	
		Male	Female	Male	Female	Male	Female	Male	Female
490-493	Bronchitis, emphysema & asthma	38.9	31.0	25.0	16.7	35.6	23.7	40.0	16.7
531-533	Gastric, duodenal, & peptic ulcer	50.0	23.8	75.0	-	46.4	25.0	66.7	-
550-553, 560	Intestinal obstruction, & hernia	28.6	15.4	100.0	-	28.6	33.3	100.0	-
571	Cirrhosis of liver	49.4	56.8	52.0	58.3	54.9	48.8	56.5	58.3
580-584	Nephritis & nephrosis	8.7	20.7	25.0	33.3	20.0	50.0	33.3	50.0
780-789	Symptoms referable to systems or organs	-	5.3	-	-	-	33.3	-	-
794	Senility	-	1.8	-	-	-	50.0	-	-
790-793, 795-796	Ill-defined diseases	-	-	-	-	-	-	-	-
800-999	Accidents, poisonings, & violence	84.3	63.3	83.3	60.0	80.8	59.6	75.0	100.0

(Table 17). Such a trend was also apparent for detection rates. Here the malignancies were no longer the exception - the detection rates even though they are high, drop for ages 70 or over. There were also some inconsistent differences in confirmation and detection rates between deaths in hospital and deaths at home, but these did not support a general conclusion that the quality of death certification was influenced by place of death (Table 18). However, causes for which confirmation rates were low such as symptoms and ill-defined conditions (ICD 780-796) frequently appeared on death certificates when the death occurred at home, but infrequently for deaths in hospital.

Participation in the AHS examination program may influence the attending physician's knowledge of the patient's problems. For persons whose death certificates indicated that tuberculosis, diabetes mellitus, or bronchitis, emphysema, and asthma was the cause of death, confirmation and detection rates were higher among the AHS/examined population (Table 19). For other causes of death, there seemed to be no consistent difference in rates for persons in the AHS program and those who were not.

With two exceptions (diabetes mellitus, and gastric, duodenal, and peptic ulcers) the causes of death in Table 20 did not indicate any relationship between confirmation and detection rates and radiation dose. These causes seemed to show an improvement in both rates with increasing T65 dose but the observations were based on very low frequencies.

にみえた(表17). 発見率にも同じような傾向が認められた. この場合, 悪性腫瘍も例外ではなかった. すなわち, 発見率は高かったが, 70歳以上の年齢群ではその率は下降した. 病院死亡例と自宅死亡例の確認率及び発見率にも一貫性のない差があったが, これによって死亡診断書の質が死亡場所によって影響を受けるという総括的な結論を導くことはできなかった(表18). しかしながら, 症状及び診断不明確な状態(ICD 780-796)などの確認率の低い死因は, 自宅死亡の場合死亡診断書に頻繁に記載されていたが, 病院死亡の場合は少なかった.

成人健康調査の検診プログラムへ組み込まれたことによって, 患者の症状に関する主治医の関心の高まりに影響を及ぼしたかもしれない. 死亡診断書の死因が結核, 糖尿病, 気管支炎, 肺気腫, 及び喘息の場合, 成人健康調査/受診者の方が確認率及び発見率共高かった(表19). その他の死因については, 成人健康調査/受診者と非受診者の間に一貫した差はないようにみえた.

二つの例外(糖尿病, 並びに胃, 十二指腸及び消化性潰瘍)を除くと, 表20に示した死因から, 確認率及び発見率と放射線量との関係を指摘することはできなかった. これらの死因はT65線量の増加と共に両率が上昇するようにみえたが, この傾向がみられる頻度は非常に少なかった.

TABLE 17 AUTOPSIED LSS DEATHS BY CAUSE OF DEATH ACCORDING TO DEATH CERTIFICATE & AUTOPSY REPORT, WITH CONFIRMATION & DETECTION RATES, AND AGE, 1961-75

表17 寿命調査集団における剖検数；死亡診断書及び剖検記録記載の死因，確認率及び発見率，並びに年齢別，1961－75年

ICD (8th Rev.)	Cause of death	Age at death in years							
		<50	50-59	60-69	70+	<50	50-59	60-69	70+
		Death certificate*				Autopsy report**			
Total	All causes	451	475	1238	2756	451	475	1238	2756
010-019	Tuberculosis	34	25	52	65	45	26	68	87
204-207	Leukemia	21	5	9	7	18	5	10	7
140-203, 208-209	Malignant neoplasms, except leukemia	124	176	451	578	140	194	496	769
250	Diabetes mellitus	6	8	16	37	5	6	10	17
430-438	Cerebrovascular diseases	31	69	264	672	27	47	139	414
390-429	Cardiovascular diseases	40	49	124	489	30	57	164	468
480-486	Pneumonia	10	5	35	120	10	6	32	132
490-493	Bronchitis, emphysema, & asthma	6	7	18	66	5	7	15	81
531-533	Gastric, duodenal, & peptic ulcers	1	2	20	35	2	3	19	37
571	Cirrhosis of liver	21	29	52	51	33	31	44	41
580-584	Nephritis & nephrosis	9	7	14	32	10	5	7	7
780-796	Symptoms & ill-defined conditions	12	9	25	242	5	6	9	24
800-999	Accidents, poisonings, & violence	42	22	31	52	44	20	30	57
Remainder in 000-799	All other diseases & conditions	94	62	127	310	77	62	195	615
		Confirmation rate				Detection rates			
Total	All causes	...	...	...	...	...	...	...	...
010-019	Tuberculosis	97.1	64.0	67.3	40.0	73.3	61.5	51.5	29.9
204-207	Leukemia	81.0	80.0	100.0	85.7	94.4	80.0	90.0	85.7
140-203, 208-209	Malignant neoplasms, except leukemia	93.5	94.3	92.0	92.7	82.9	85.6	83.7	69.7
250	Diabetes mellitus	66.7	37.5	37.5	24.3	80.0	50.0	60.0	52.9
430-438	Cerebrovascular diseases	71.0	52.2	39.4	38.8	81.5	76.6	74.8	63.0
390-429	Cardiovascular diseases	42.5	57.1	41.9	37.4	56.7	49.1	31.7	39.1
480-486	Pneumonia	60.0	20.0	22.9	13.3	60.0	16.7	25.0	12.1
490-493	Bronchitis, emphysema & asthma	50.0	85.7	33.3	27.3	60.0	85.7	40.0	22.2
531-533	Gastric, duodenal, & peptic ulcers	100.0	50.0	50.0	34.3	50.0	33.3	52.6	32.4
571	Cirrhosis of liver	71.4	65.5	50.0	39.2	45.4	61.3	59.1	48.8
580-584	Nephritis & nephrosis	66.7	28.6	21.4	-	60.0	40.0	42.9	-
780-796	Symptoms & ill-defined conditions	8.3	-	8.0	2.5	20.0	-	22.2	25.0
800-999	Accidents, poisonings, & violence	97.6	72.7	80.6	55.8	93.2	80.0	83.3	50.9
Remainder in 000-799	All other diseases & conditions	...	...	...	...	...	...	...	...

*Number with this underlying cause of death on death certificate, who were autopsied. この原死因で剖検を受けた数
**Number of autopsies with this principal autopsy diagnosis. この主要剖検診断による剖検数

Comparisons for Three Time Periods

Changes over time in the quality of cause of death certification or of selection practices among pathologists could seriously influence confirmation and detection rates. Figures shown separately for each 5-year period, 1961-65, 1966-70, 1971-75 reflected both increases and declines in the rates during these 15 years (Table 21). Confirmation rates increased for cerebro-

三つの期間の比較

死亡診断書死因の質，ないしは病理医の選択死因の質における経年的変化が，確認率及び発見率に大きく影響した可能性がある．5年の期間，すなわち，1961－65年，1966－70年，1971－75年の期間ごとに示した数字は，この15年間の両率の上昇及び下降を反映していた（表21）．確認率が上昇したのは脳血管

TABLE 18 AUTOPSIED LSS DEATHS BY CAUSE OF DEATH ACCORDING TO DEATH CERTIFICATES & AUTOPSY REPORTS, WITH CONFIRMATION & DETECTION RATES, AND PLACE OF DEATH, 1961-75

表18 寿命調査集団における剖検数；死亡診断書及び剖検記録記載の死因，確認率及び発見率，並びに死亡場所別，1961－75年

ICD (8th Rev.)	Cause of death	Place of Death					
		Hospital	Clinic	Home	Hospital	Clinic	Home
		Death certificate*			Autopsy report**		
Total	All causes	2487	178	2255	2487	178	2255
010-019	Tuberculosis	123	3	50	121	6	99
204-207	Leukemia	35	4	3	32	5	3
140-203, 208-209	Malignant neoplasms, except leukemia	970	50	309	1103	50	446
250	Diabetes mellitus	36	2	29	22	-	16
430-438	Cerebrovascular diseases	319	40	677	251	31	345
390-429	Cardiovascular diseases	295	19	388	224	20	475
480-486	Pneumonia	67	8	95	52	6	122
490-493	Bronchitis, emphysema, & asthma	36	2	59	42	2	64
531-533	Gastric, duodenal, & peptic ulcers	35	1	22	37	4	20
571	Cirrhosis of liver	106	6	41	103	7	39
580-584	Nephritis & nephrosis	31	1	30	22	1	6
780-796	Symptoms & ill-defined conditions	19	2	267	17	-	27
800-999	Accidents, poisonings, & violence	76	9	62	75	9	67
Remainder in 000-799	All other diseases & conditions	339	31	223	386	37	526
		Confirmation rate			Detection rate		
010-019	Tuberculosis	63.4	66.7	60.0	64.5	33.3	30.3
204-207	Leukemia	82.9	100.0	100.0	90.6	80.0	100.0
140-203, 208-209	Malignant neoplasms, except leukemia	92.7	90.0	93.5	81.5	90.0	64.8
250	Diabetes mellitus	38.9	-	27.6	63.6	-	50.0
430-438	Cerebrovascular diseases	48.9	62.5	35.7	62.2	80.6	70.1
390-429	Cardiovascular diseases	39.7	42.1	39.9	52.2	40.0	32.6
480-486	Pneumonia	11.9	37.5	21.1	15.4	50.0	16.4
490-493	Bronchitis, emphysema, & asthma	41.7	50.0	28.8	35.7	50.0	26.6
531-533	Gastric, duodenal, & peptic ulcers	48.6	-	31.8	45.9	-	35.0
571	Cirrhosis of liver	58.5	66.7	34.1	60.2	57.1	35.9
580-584	Nephritis & nephrosis	35.5	-	-	50.0	-	-
780-796	Symptoms & ill-defined conditions	10.5	-	2.6	11.8	-	25.9
800-999	Accidents, poisonings, & violence	75.0	66.7	77.4	76.0	66.7	71.6

*Number with this underlying cause of death, who were autopsied. この原死因で剖検を受けた数

**Number of autopsies with this principal diagnosis. この主要診断による剖検数

vascular disease (ICD 430-438), and dropped for diabetes mellitus (ICD 250), pneumonia (ICD 480-486) and violent deaths (ICD 800-999). Detection rates also declined for tuberculosis, cerebrovascular disease, and pneumonia, as well as for accidents and other violent deaths. The RERF autopsy program has attempted to maintain consistent practices in the selection of a principal diagnosis. The selection of the underlying cause of death may have been influenced by the introduction of the ICD 8th

障害（ICD 430-438）．下降したのは糖尿病（ICD 250），肺炎（ICD 480-486），及び外因死（ICD 800-999）であった．結核，脳血管障害，肺炎，事故及びその他の外因による死亡の場合，発見率も下降していた．放影研の剖検プログラムでは主要診断の選択に一貫した慣行を保つよう試みてきた．ICD の第8回修正版の導入によって原死因の選択に影響が生じたかも

TABLE 19 AUTOPSIED LSS DEATHS BY CAUSE OF DEATH ACCORDING TO DEATH CERTIFICATE AND AUTOPSY REPORT WITH CONFIRMATION AND DETECTION RATES, AND AHS PARTICIPATION, 1961-75

表19 寿命調査集団における剖検数；死亡診断書及び剖検記録記載の死因，確認率及び発見率，並びに成人健康調査への参加状態別，1961－75年

ICD (8th Rev.)	Cause of death	Participation in Adult Health Study					
		Not AHS	AHS/ Exam	AHS/ Unexam	Not AHS	AHS/ Exam	AHS/ Unexam
		Death certificate*			Autopsy report**		
Total	All causes	3733	1151	36	3733	1151	36
010-019	Tuberculosis	122	52	2	171	53	2
204-207	Leukemia	28	13	1	28	12	-
140-203, 208-209	Malignant neoplasms, except leukemia	975	341	13	1189	394	16
250	Diabetes mellitus	42	25	-	24	14	-
430-438	Cerebrovascular diseases	794	232	10	477	147	3
390-429	Cardiovascular diseases	552	146	4	552	163	4
480-486	Pneumonia	144	25	1	152	28	-
490-493	Bronchitis, emphysema, & asthma	73	24	-	78	30	-
531-533	Gastric, duodenal, & peptic ulcers	47	10	1	49	11	1
571	Cirrhosis of liver	123	30	-	108	41	-
580-584	Nephritis & nephrosis	45	17	-	18	11	-
780-796	Symptoms & ill-defined conditions	234	54	-	35	9	-
800-999	Accidents, poisonings, & violence	103	44	-	105	46	-
Remainder in 000-799	All other diseases & conditions.	451	138	4	747	192	10
		Confirmation rate			Detection rate		
Total	All causes	...	...	...	...	...	...
010-019	Tuberculosis	61.5	67.3	-	43.9	66.0	-
204-207	Leukemia	92.9	76.9	-	92.9	83.3	-
140-203, 208-209	Malignant neoplasms, except leukemia	92.8	92.4	100.0	76.1	79.9	81.3
250	Diabetes mellitus	26.2	44.0	-	45.8	78.6	-
430-438	Cerebrovascular diseases	40.6	42.2	30.0	67.5	66.7	100.0
390-429	Cardiovascular diseases	40.6	38.4	-	40.6	34.4	-
480-486	Pneumonia	19.4	12.0	-	18.4	10.7	-
490-493	Bronchitis, emphysema, & asthma	30.1	45.8	-	28.2	36.7	-
531-533	Gastric, duodenal, & peptic ulcers	42.6	30.0	100.0	40.8	27.3	100.0
571	Cirrhosis of liver	52.0	53.3	-	59.3	39.0	-
580-584	Nephritis & nephrosis	17.8	17.6	-	44.4	27.3	-
780-796	Symptoms & ill-defined conditions	3.4	1.9	-	22.9	11.1	-
800-999	Accidents, poisonings, & violence	72.8	81.8	-	71.4	78.3	-
Remainder in 000-799	All other diseases & conditions	...	...	...	...	...	...

*Number with this underlying cause of death, who were autopsied. この原死因で剖検を受けた数
**Number of autopsies with this principal autopsy diagnosis. この主要剖検診断による剖検数

Revision, although some effort was made to convert all classified data to an equivalent 8th Revision rubric.

しれないが，分類した全診断をそれに相当する第８回修正版の死因に書きかえるよう努力はされた．

Autopsy Findings and Radiation Dose

The examination of confirmation and detection rates serves to measure the accuracy and

剖検所見及び放射線量

確認率及び発見率の検討は剖検記録を作成する病理医の診断と比較した場合，死亡診断書記載の死因の

TABLE 20 AUTOPSIED LSS DEATHS BY CAUSE OF DEATH ACCORDING TO DEATH CERTIFICATE AND AUTOPSY REPORT, WITH CONFIRMATION AND DETECTION RATES, AND RADIATION DOSE, 1961-75

表20　寿命調査集団における剖検数；死亡診断書及び剖検記録記載の死因，確認率及び発見率，並びに放射線量別，1961－75年

ICD (8th Rev.)	Cause of death	T65 dose in rad											
		NIC	<1	1-49	50-99	100-199	200+	NIC	<1	1-49	50-99	100-199	200+
		Death certificate*						Autopsy report**					
Total	All causes	1075	1554	1644	236	163	174	1075	1554	1644	236	163	174
010-019	Tuberculosis	44	51	49	9	7	11	50	74	67	13	7	10
204-207	Leukemia	7	9	13	1	2	7	7	9	11	2	2	7
140-203, 208-209	Malignant neoplasms, except leukemia	319	400	423	60	51	54	382	497	489	76	64	66
250	Diabetes mellitus	13	28	12	5	4	4	6	10	10	5	4	2
430-438	Cerebrovascular diseases	207	334	377	45	28	34	130	204	219	28	15	20
390-429	Cardiovascular diseases	131	231	248	43	21	20	157	222	250	30	22	26
480-486	Pneumonia	34	56	56	12	5	4	39	62	63	5	6	2
490-493	Bronchitis, emphysema, & asthma	27	32	27	-	5	3	32	37	30	3	4	2
531-533	Gastric, duodenal, & peptic ulcers	10	14	23	3	5	1	14	11	26	4	4	2
571	Cirrhosis of liver	38	50	46	8	6	4	35	40	48	13	4	7
580-584	Nephritis & nephrosis	18	25	15	4	-	-	7	11	7	2	1	1
780-796	Symptoms & ill-defined conditions	75	91	95	9	8	6	7	18	14	4	-	1
800-999	Accidents, poisonings, & violence	31	55	47	8	3	1	27	57	51	8	4	3
Remainder in 000-799	All other diseases & conditions	121	178	213	29	18	25	182	302	359	43	26	25

TABLE 20 CONTINUED 表20 続き

ICD (8th Rev.)	Cause of death	T65 dose in rad											
		NIC	<1	1-49	50-99	100-199	200+	NIC	<1	1-49	50-99	100-199	200+
		Confirmation rate						Detection rate					
Total	All causes	...	...	...	...	...	...	...	...	...	...	...	...
010-019	Tuberculosis	54.5	74.5	59.2	55.6*,	57.1	54.5	48.0	51.4	43.3	38.5	57.1	60.0
204-207	Leukemia	100.0	100.0	76.9	100.0	100.0	71.4	100.0	100.0	90.9	50.0	100.0	71.4
140-203, 208-209	Malignant neoplasms, except leukemia	92.5	94.0	91.5	91.7	98.0	92.6	77.2	75.7	79.1	72.4	78.1	75.8
250	Diabetes mellitus	46.2	14.3	25.0	40.0	100.0	50.0	100.0	40.0	30.0	40.0	100.0	100.0
430-438	Cerebrovascular diseases	36.2	43.4	40.3	42.2	39.3	44.1	57.7	71.1	69.4	67.9	73.3	75.0
390-429	Cardiovascular diseases	38.2	39.8	39.9	39.5	42.9	35.0	31.8	41.4	39.6	56.7	40.9	26.9
480-486	Pneumonia	26.5	14.3	21.4	8.3	20.0	-	23.1	12.9	19.0	20.0	16.7	-
490-493	Bronchitis, emphysema, & asthma	44.4	25.0	40.7	-	40.0	-	37.5	21.6	36.7	-	50.0	-
531-533	Gastric, duodenal, & peptic ulcers	50.0	7.1	52.2	66.7	60.0	100.0	35.7	9.1	46.2	50.0	75.0	50.0
571	Cirrhosis of liver	52.6	52.0	50.0	62.5	33.3	75.0	57.1	65.0	47.9	38.5	50.0	42.9
580-584	Nephritis & nephrosis	11.1	24.0	13.3	25.0	-	-	28.6	54.5	28.6	50.0	-	-
780-796	Symptoms & ill-defined conditions	1.3	4.4	3.2	11.1	-	-	14.3	22.2	21.4	25.0	-	-
800-999	Accidents, poisonings, & violence	71.0	76.4	78.7	62.5	100.0	100.0	81.5	73.7	72.5	62.5	75.0	33.3
Remainder in 000-799	All other diseases & conditions	...	...	...	...	...	...	...	...	...	...	...	...

*Number with this underlying cause of death on death certificate, who were autopsied. 死亡診断書のこの原死因で剖検を受けた数

**Number of autopsies with this principal autopsy diagnosis. この主要剖検診断による剖検数

TABLE 21 NUMBER OF LSS DEATHS AUTOPSIED, BY CAUSE OF DEATH, CONFIRMATION AND DETECTION RATES, AND PERIOD OF DEATH, 1961-75

表21 寿命調査集団における剖検数，死因，確認率，及び発見率，並びに死亡期間別，1961－75年

ICD (8th Rev.)	Cause of death	1961-65	1966-70	1971-75	1961-65	1966-70	1971-75
		Death certificate*			Autopsy report**		
Total	All causes	2037	1860	1023	2037	1860	1023
010-019	Tuberculosis	85	75	16	103	89	34
204-207	Leukemia	17	18	7	15	17	8
140-203, 208-209	Malignant neoplasms, except leukemia	513	505	311	601	632	366
250	Diabetes mellitus	27	23	17	20	11	7
430-438	Cerebrovascular diseases	447	390	199	145	279	203
390-429	Cardiovascular diseases	233	288	181	354	236	129
480-486	Pneumonia	71	59	40	79	78	23
490-493	Bronchitis, emphysema, & asthma	38	37	22	42	33	33
531-533	Gastric, duodenal, & peptic ulcers	22	22	14	22	24	15
571	Cirrhosis of liver	54	63	36	68	44	37
580-584	Nephritis & nephrosis	23	23	16	11	11	7
780-796	Symptoms & ill-defined conditions	168	80	40	24	17	3
800-999	Accidents, poisonings, & violence	79	50	18	82	48	21
Remainder in 000-799	All other diseases & conditions	260	227	106	471	341	137
		Confirmation rate			Detection rate		
Total	All causes	...	...	...	...	...	...
010-019	Tuberculosis	62.4	64.0	56.3	51.5	53.9	26.5
204-207	Leukemia	88.2	83.3	85.7	100.0	88.2	75.0
140-203, 208-209	Malignant neoplasms, except leukemia	92.2	93.3	92.9	78.7	74.5	79.0
250	Diabetes mellitus	51.9	21.7	17.6	70.0	45.5	42.9
430-438	Cerebrovascular diseases	24.8	50.0	58.8	76.6	69.9	57.6
390-429	Cardiovascular diseases	42.1	41.7	34.3	27.7	50.8	48.1
480-486	Pneumonia	29.6	13.6	5.0	26.6	10.3	8.7
490-493	Bronchitis, emphysema, & asthma	36.8	29.7	36.4	33.3	33.3	24.2
531-533	Gastric, duodenal, & peptic ulcers	50.0	27.3	50.0	50.0	25.0	46.7
571	Cirrhosis of liver	63.0	41.3	55.6	50.0	59.1	54.1
580-584	Nephritis & nephrosis	13.0	30.4	6.3	27.3	63.6	14.3
780-796	Symptoms & ill-defined conditions	3.0	3.7	2.6	20.8	17.6	33.3
800-999	Accidents, poisonings, & violence	87.3	60.0	66.7	84.1	62.5	57.1
Remainder in 000-799	All other diseases & conditions	...	...	...	...	...	...

*Number with this underlying cause of death on death certificate, who were autopsied.
死亡診断書のこの原死因で剖検を受けた数

**Number of autopsies with this principal diagnosis. この主要診断による剖検数

consistency of medical certification reported on the death certificate, compared with the statement of the pathologist completing the autopsy report. As has been previously noted, neither the clinician's nor the pathologist's reports can always be expected to be the more accurate. Some diagnoses can be reached more readily from clinical observations and others can only be known through pathological examination. The important use of diagnostic data in the

正確性及び一貫性を測定する上に役立つ．以前に指摘されたように，臨床医の診断と病理医の診断と比較して一方が他方よりも常に正確性が高いとは言えない．診断の中には臨床観察によってより簡単に判明するものもあれば，病理検査によってのみ明らかとなるものもある．ここでの診断資料の重要な利用法

present context is the assessment of its relationship to radiation exposure.

This relationship has been examined in great detail from death certificate statements of cause of death.[7] The use of autopsy reports to distinguish radiation effects is more difficult because of the limited number of autopsies, and their selective nature. Nevertheless, if the assumption can be accepted that, had all deaths in the LSS sample been autopsied, the relationships between the cause of death statement on the death certificate and the principal autopsy diagnosis would be the same as that found for those autopsied, then it is possible to estimate a cause of death distribution for the entire LSS sample that might have resulted had all deaths been autopsied. Unpublished estimates were prepared under this assumption separately for deaths in each of three T65 dose groups (<1, 1-99, 100+ rad) tabulated by the cause of death groups shown in Table 20. However, the resulting rates by dose revealed no significant differences other than those already observed from death certificate data.

は，その診断と放射線被曝との関係を評価することにある．

この関係は診断書死因を用いて詳細に評価されている．[7] 放射線の影響を明らかにするために剖検記録を使用することは，剖検数に制限がある点や剖検例の選択性から考えると難しい．しかしながら，寿命調査集団中の全死亡者が剖検を受けたとして，死亡診断書の死因と主要剖検診断との関係が，ここに報告した被剖検者にみられた関係と同じになるという仮定が認められれば，全死亡例の剖検が行われた場合の寿命調査集団全体の死因の分布状況を推定することができる．この仮定に基づいて三つのT65線量群（<1, 1-99, 100+rad）ごとに死亡者の死因の推定を行い（未発表）表20に記載した死因群別に別に製表してみたが，その線量別の確認率及び発見率からは，既に死亡診断書資料で観察された以外の有意な差は明らかにされなかった．

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