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## Chapter 4 Types of Injury

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## EXECUTIVE SUMMARY

- Head injuries are a common form of trauma accounting for 1386 admissions between 1995 and 1999.
- The number of patients transferred in with a head injury has increased slightly.
- Almost 30% of patients with head injury have some form of functional outcome problem requiring home help or rehabilitation.
- There has been an improvement since 1995 in the time to operating theatre from arrival in the Emergency Department in patients undergoing craniotomy for sub-dural or extra-dural haematoma, with 35% of patients in 1999 in the operating theatre within 1 hour of arrival at the hospital.
- Sub-dural haematomas account for 18% of significant intracranial diagnosis, extra-dural 6%.
- Thoracic injuries accounted for 1,273 admissions to Liverpool Hospital between 1995 and 1999 with a 9% mortality rate. The sex, age and injury severity pattern over the 5 years has remained constant.
- Pedestrians and cyclists sustaining chest injury have the greatest mortality, approaching 22%.
- There has been an improvement in survival outcome in thoracic trauma over the 5 years.
- 800 patients were admitted to Liverpool Hospital between 1995 and 1999 with abdominal injuries.
- Penetrating trauma accounts for 16% of abdominal trauma but a significant reduction to 8% in 1999.
- The number of patients transferred to Liverpool Hospital with abdominal injuries increased steadily over the 5 years reaching 13% in 1999.
- The commonest organ injured in blunt trauma was the spleen followed by the liver, kidney, small bowel and mesentery. In penetrating trauma, the liver, kidney, large bowel, major vessels and small bowel were the dominant organs injured.
- For those undergoing laparotomy in blunt trauma, 20% had bowel injury, 16% had splenic injury.
- The splenorrhaphy rate was 32% for those undergoing laparotomy for splenic injury.
- For patients in the minor injury category, orthopaedics was the predominant sub-speciality admitting team.
- There appears to be an increasing number of unrestrained drivers and passengers in road trauma patients.
- Since 1997, on 12 patients in the major injury category reported an air-bag.

## HEAD INJURY ADMISSIONS TO LIVERPOOL HOSPITAL

1386 patients were admitted to Liverpool Hospital with head injuries during the 5 year period from 1995 to 1999. Head injured patients included all patients who had AIS-90 coded injury in the Head Region with a score of 2 or more. This excludes patients whose only injury was minor scalp laceration or abrasion. 1055 (76.1%) were males and 331 (23.9%) females. The mean age for patients was 32.9 years (range 0-93). 1246 (89.9%) survived and 140 (10.1%) patients died as a result of head injuries. The mean length of stay in hospital for patients with head injury was 10.1 days  $\nabla$  12.9 (1-129).

1184 (85.4%) received pre-hospital intervention and 202 (14.6%) arrived by private transport. For patients transported by ambulance the mean total pre-hospital time was 45 minutes (range 10 mins - 2 hours and 58 minutes). For 892 (64.4%) of the patients the head or neck was the predominant body region injured, for 244 (17.6%) the head or neck had equal severity with another body region and for 250 patients (18%) injuries to another body region were more serious than the patient's head injury. 77 of the patients with head injuries underwent laparotomy and 6 of these patients also underwent craniotomy for acute Extra-dural or Sub-dural.

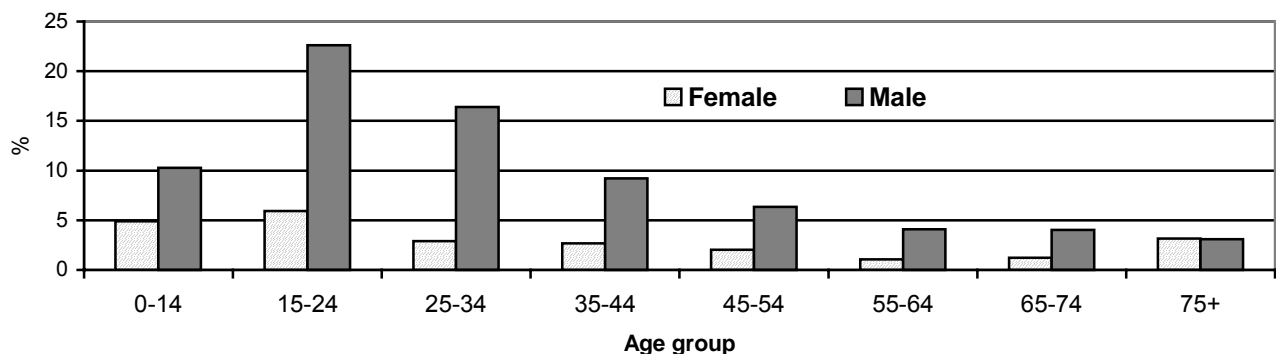
### Annual Trends for Head Injury: Sex Distribution

Sex	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Males	160	73.1	213	77.7	196	77.2	226	76.9	260	75.4	1055	76.1
Females	59	26.9	61	22.3	58	22.8	68	23.1	84	24.6	331	23.8
Total	219	100	274	100	254	100	294	100	345	100	1386	100

### Annual Trends for Head Injury: Age and ISS

	1995	1996	1997	1998	1999	Total
Age	30.5 $\nabla$ 20.8 (0-91)	32.8 $\nabla$ 21.7 (0-91)	31.5 $\nabla$ 19.4 (0-87)	32.4 $\nabla$ 21.1 (0-91)	36 $\nabla$ 21.6 (0-93)	32.9 $\nabla$ 21.1 (0-93)
ISS	17.1 $\nabla$ 13.5 (4-75)	17.8 $\nabla$ 14 (4-75)	18.9 $\nabla$ 13.7 (4-75)	17.4 $\nabla$ 11.6 (4-75)	17.1 $\nabla$ 12.1 (4-75)	17.7 $\nabla$ 12.9 (4-75)

### Head Injuries: Age and Sex Distribution



### Type of Trauma for Patients with Head Injury

Type	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Blunt	216	98.6	264	96.4	248	97.6	289	98.3	338	98.0	1355	97.8
Penetrating	3	1.4	10	3.6	6	2.4	5	1.7	7	2.0	31	2.2
Total Injuries	219	100	274	100	254	100	294	100	345	100	1386	100

### Mechanism of Injury for Head Injury

Mechanism	Survive	%	Die	%	Total	%
Road Vehicle	374	27	50	3.61	424	30.6
Motor Cyclist	88	6.3	7	0.51	95	6.85
Pedestrian/Cyclist	229	16.5	30	2.16	259	18.7
Interpersonal Violence	209	15.1	13	0.94	222	16
Industrial	29	2.1	1	0.07	30	2.16
Falls	236	17	34	2.45	270	19.5
Other	81	5.8	5	0.36	86	6.2
<b>Total</b>	<b>1246</b>	<b>89.9</b>	<b>140</b>	<b>10.1</b>	<b>1386</b>	<b>100</b>

### Origin of Arrival for Patients with Head Injury

Origin	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Direct	178	81.3	227	82.8	222	87.4	238	81.0	269	78.0	1134	81.8
Transfer	41	18.7	47	17.2	32	12.6	56	19.0	76	22.0	252	18.2
<b>Total</b>	<b>219</b>	<b>100</b>	<b>274</b>	<b>100</b>	<b>254</b>	<b>100</b>	<b>294</b>	<b>100</b>	<b>345</b>	<b>100</b>	<b>1386</b>	<b>100</b>

### Survival Outcome of Patients with Head Injury

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Survive	197	90.0	236	86.1	232	91.3	263	89.5	318	92.2	1246	89.9
Died	22	10.0	38	13.9	22	8.7	31	10.5	27	7.8	140	10.1
<b>Total</b>	<b>219</b>	<b>100</b>	<b>274</b>	<b>100</b>	<b>254</b>	<b>100</b>	<b>294</b>	<b>100</b>	<b>345</b>	<b>100</b>	<b>1386</b>	<b>100</b>

### Head Injury: Patients Receiving Pre-hospital Intervention

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
CDA	181	82.6	233	85.0	232	91.3	249	84.7	289	83.8	1184	85.4
Nil (private)	38	17.4	41	15.0	22	8.7	45	15.3	56	16.2	202	14.6
<b>Total</b>	<b>219</b>	<b>100</b>	<b>274</b>	<b>100</b>	<b>254</b>	<b>100</b>	<b>294</b>	<b>100</b>	<b>345</b>	<b>100</b>	<b>1386</b>	<b>100</b>

### Total Pre-hospital Time: Head Injury

(Time from Ambulance Request time to arrival at hospital)

Prehospital Time	1995	1996	1997	1998	1999	Total
Median (minutes)	42	40	41	42	43	42
Range	11-125	12-143	12-161	10-116	16-178	10-178

### Injury Severity Score for Patients with Head Injury

ISS	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
1 to 8	52	23.7	54	19.7	50	19.7	54	18.4	68	27.8	278	20.1
9 to 15	69	31.5	92	33.6	69	27.2	91	31.0	120	49.0	441	31.8
16 to 24	49	22.4	59	21.5	62	24.4	70	23.8	71	29.0	311	22.4
25 to 49	40	18.3	57	20.8	62	24.4	72	24.5	77	31.4	308	22.2
50 to 74	5	2.3	7	2.6	8	3.1	5	1.7	8	3.3	33	2.4
75	4	1.8	5	1.8	3	1.2	2	0.7	1	0.4	15	1.1
<b>Total</b>	<b>219</b>	<b>100</b>	<b>274</b>	<b>100</b>	<b>254</b>	<b>100</b>	<b>294</b>	<b>100</b>	<b>245</b>	<b>100</b>	<b>1386</b>	<b>100</b>

### Status on Discharge of Patients with Head Injury

Status	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Full Recovery	131	9.5	162	11.7	136	9.8	181	13.1	228	16.5	838	60.5
Home help	18	1.3	12	0.9	10	0.7	13	0.9	9	0.7	62	4.5
Rehabilitation	33	2.4	31	2.2	52	3.8	45	3.2	49	3.5	210	15.2
Died	21	1.5	36	2.6	22	1.6	31	2.2	27	1.9	137	9.9
Other hospital	16	1.2	33	2.4	34	2.5	24	1.7	32	2.3	139	10.0
Total	219	100	274	100	254	100	294	100	345	100	1386	100

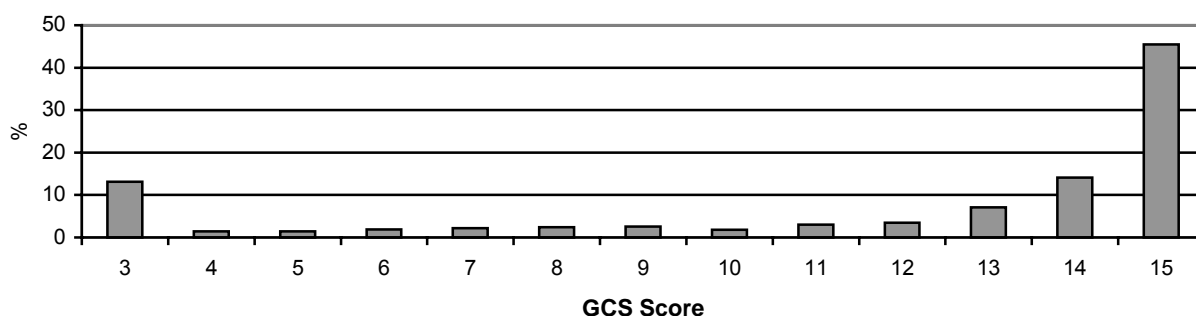
### Glasgow Coma Scale on Arrival in ED

GCS	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
≤ 8	49	22.4	67	24.5	62	24.4	68	23.1	64	18.6	310	22.4
9 to 12	24	11.0	40	14.6	26	10.2	30	10.2	31	9.0	151	10.9
13-14	51	23.3	46	16.8	57	22.4	62	21.1	78	22.6	294	21.2
15	95	43.4	121	44.2	109	42.9	134	45.6	172	49.9	631	45.5
Total	219	100	274	100	254	100	294	100	345	100	1386	100

### Level of Consciousness (GCS) on Arrival and Patient Outcome

GCS	Survived	%	Died	%	Total	%
3-8	201	14.5	109	7.9	310	22.4
9 to 12	138	10.0	13	0.9	151	10.9
13-14	293	21.1	5	0.4	298	21.5
15	614	44.3	13	0.9	627	45.2
Total	1246	89.9	140	10.1	1386	100

### Glasgow Coma Scale on Arrival in ED



### Craniotomy for Acute Subdural or Extradural

(Time to Craniotomy from arrival in Emergency Department)

Time	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
≤ 1hour	1	7.1	2	12.5	9	28.1	10	38.5	7	35.0	29	26.9
1 to 4hrs	7	50.0	6	37.5	17	53.1	13	50.0	8	40.0	51	47.2
> 4 hours	6	42.9	8	50.0	6	18.8	3	11.5	5	25.0	28	25.9
Total	14	100	16	100	32	100	26	100	20	100	108	100

### Head CT Results

841 patients with head injuries underwent Head CT scan during resuscitative phase of admission. 361 (42.9%) had normal cerebral findings. 480 (57.1%) patients had abnormal findings. In the event of more than one abnormality the most serious or significant finding was recorded. 156 (18.5%) had Sub-dural haematoma, 54 (6.4%) had Extra-dural haematoma, 196 (23.3%) had Cerebral Oedema or Contusion, Sub-arachnoid or Intracranial Haemorrhage, and 74 (8.8%) had a skull fracture.

## HEAD INJURED PATIENTS Body Region and Score for All Injuries Sustained

There was a total of 6,641 injuries for the group of 1,386 patients with head injury. This table shows the injury severity score for each injury by Body region and sub-region.

Value of score codes

1 minor      2 moderate      3 serious      4 severe      5 critical      6 =maximum

Body Region	Sub-Region	1	2	3	4	5	6	Total
Head	Internal Organs			349	335	336	5	1025
	Level of consciousness	12	674	173	40	23		922
	Nerves, Cranial		35					35
	Skeletal		169	230	25			424
	Vessels, Intracranial			2	5	4		11
	Whole Area	280	70	18		4	3	375
Total		292	948	772	405	367	8	2792
Face	Internal Organs	68	10					78
	Skeletal	186	251	47	6			490
	Vessels	2						2
	Whole Area	509	44	1				554
Total		765	305	48	6			1124
Neck	Internal Organs	1	3	1		1		6
	Skeletal		2					2
	Vessels			3	1			4
	Whole Area	46	2					48
Total		47	7	4	1	1		60
Spine	Cervical spine	7	55	30	2	2	3	99
	Lumbar spine	1	63	11				75
	Thoracic spine	3	42	12		3		60
Total		11	160	53	2	5	3	234
Thorax	Internal Organs	1	3	127	28	23		182
	Skeletal	61	85	62	42	17		267
	Vessels			1	7	8		16
	Whole Area	115						115
Total		177	88	190	77	48		580
Abdomen and Pelvic contents	Internal Organs	7	105	44	25	22		203
	Vessels			6	3			9
	Whole Area	96						96
Total		103	105	50	28	22		308
Lower Extremity	Muscle-tendons-ligaments		16	2				18
	Nerves		1					1
	Skeletal-bones	8	284	171	4	12		479
	Skeletal-joints	36	28					64
	Vessels	2	2	2	2			8
	Whole Area	241	20	9				270
Total		287	351	184	6	12		840
Upper Extremity	Muscles-tendons-ligaments	6	5					11
	Nerves		5					5
	Skeletal-bones	23	237	53				313
	Skeletal-joints	48	20	1				69
	Vessels	2		1				3
	Whole Area	178	17	1				196
Total		257	284	56				597
External, burns	Burns	4	2					6
	Skin & subcutaneous tissue	99						99
	Other trauma		1					1
Total		103	3					106
<b>Grand Total</b>		<b>2042</b>	<b>2251</b>	<b>1357</b>	<b>525</b>	<b>455</b>	<b>11</b>	<b>6,641</b>

## HEAD INJURED PATIENTS

### Injury Description and Score for Head Injuries Sustained

Injuries to the head cavity totalled 2,792 for the group of 1,386 patients with head injury. This table shows the number of patients sustaining each type of head injury.

Value of score codes

1 minor      2 moderate      3 serious      4 severe      5 critical      6 =maximum

AIS Description	1	2	3	4	5	6	Total
<b>Injuries for Patients with Head Trauma n=1,386</b>							
<b>Whole Area (scalp, nerves, vessels, skull)</b>							
Scalp	280	70	12				362
Nerves, Cranial		35					35
Vessels, Intracranial			2	5	4		11
Skeletal, Base (basilar) fracture			158	5			163
Skeletal, Vault fracture		169	78	20	4	3	274
Whole Area Total	280	274	250	30	8	3	845
<b>Internal Organs</b>							
Brain stem					53	5	58
Cerebellum			24	9	20		53
Cerebrum, contusion			164	37	26		227
Cerebrum Diffuse axonal injury					33		33
Cerebrum, Extradural				67	30		97
Cerebrum, Intracerebral haematoma				52	27		79
Cerebrum, Subdural hematoma				129	111		240
Cerebrum, Brain Swelling			2	8	7		17
Cerebrum, Edema			37	23	28		88
Cerebrum, infarction or ischaemia			8				8
Cerebrum, intraventricular hemorrhage				6			6
Cerebrum, laceration				4	1		5
Cerebrum, pneumocephalus			10				10
Cerebrum, subarachnoid hemorrhage			104				104
Internal Organs Total			349	335	336	5	1025
<b>Level of consciousness</b>							
GCS <= 8 ∇ neurological deficit			57	25	9		91
Initial obs (GCS 15) ∇ prior LOC, ∇ deficit	12	349	22				383
Initial obs (GCS 9-14) ∇ prior LOC, ∇ deficit		186	67	1			254
Unconsciousness ∇ neurological deficit		95	27	14	14		150
Cerebral Concussion		44					44
Level of consciousness Total	12	674	173	40	23		922
Grand Total	292	948	772	405	367	8	2792

## THORACIC INJURY ADMISSIONS TO LIVERPOOL HOSPITAL

1273 patients were admitted to Liverpool Hospital with thoracic injuries during the 5 year period from 1995 to 1999. Thoracic injured patients included all patients who had AIS-90 coded injury in the Chest Region. 912 (71.6%) were males and 361 (28.4%) females. The mean age for patients was 40.7  $\nabla$ 19.9 years (range 1-99). 1157 (90.9%) survived and 116 (9.1%) patients died who sustained thoracic injuries. The mean length of stay in hospital for patients with thoracic injury was 11.1 days  $\nabla$  15.4 (1-213).

1126 (88.5%) received pre-hospital intervention and 147 (11.5%) arrived by private transport. For 674 (52.9%) patients the thoracic region was the predominant body region of injury. 52 of the patients with thoracic injuries underwent thoracotomy. Seven patients underwent emergency thoracotomy in the Emergency Department.

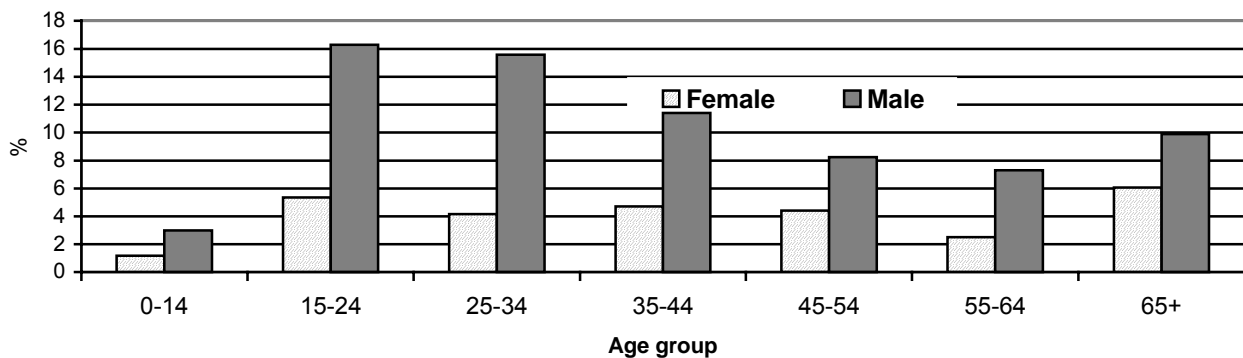
### Annual Trends for Thoracic Injury: Sex Distribution

Sex	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Males	139	70.9	187	71.1	194	72.7	191	74.9	201	68.8	912	71.6
Females	57	29.1	76	28.9	73	27.3	64	25.1	91	31.2	361	28.4
Total	196	100	263	100	267	100	255	100	282	100	1273	100

### Annual Trends for Thoracic Injury: Age and ISS

	1995	1996	1997	1998	1999	Total
Age	39.3 $\nabla$ 21.1 (1-83)	41.1 $\nabla$ 20.8 (0-90)	39.7 $\nabla$ 18.1 (2-95)	40.2 $\nabla$ 19.0 (3-86)	42.5 $\nabla$ 20.6 (1-99)	40.7 $\nabla$ 19.9 (0-99)
ISS	16 $\nabla$ 15 (1-75)	15.6 $\nabla$ 14.7 (1-75)	16.8 $\nabla$ 15.2 (1-75)	15.7 $\nabla$ 14.2 (1-75)	15.3 $\nabla$ 14.1 (1-75)	15.8 $\nabla$ 14.6 (1-75)

### Thoracic Injuries: Age and Sex Distribution



### Type of Trauma for Patients with Thoracic Injury

Type	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Blunt	178	90.8	233	88.6	230	86.1	224	87.8	267	91.4	1132	88.9
Penetrating	18	9.2	30	11.4	37	13.9	31	12.2	25	8.6	141	11.1
Total Injuries	196	100	263	100	267	100	255	100	282	100	1273	100

## THORACIC INJURY PATIENTS

### Mechanism of Injury for Thoracic Injury

Mechanism	Survive		Die	%	Total	%
Road Vehicle	535	91.5	50	8.5	585	46.0
Motor Cyclist	74	90.2	8	9.8	82	6.4
Pedestrian/Cyclist	102	78.5	28	21.5	130	10.2
Blunt Interpersonal	82	97.6	2	2.4	84	6.6
Stabbing/Gunshot	113	89.7	13	10.3	126	9.9
Industrial	36	97.3	1	2.7	37	2.9
Falls	186	93	14	7.0	200	15.7
Other	29	100	0	0.0	29	2.3
Total	1157	90.9	116	9.1	1273	100

### Origin of Arrival for Patients with Thoracic Injury

Origin	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Direct	182	92.9	246	93.5	242	90.6	235	91.2	259	88.7	1164	91.4
Transfer	14	7.1	17	6.5	25	9.4	20	7.8	33	11.3	109	8.6
Total	196	100	263	100	267	100	255	100	282	100	1273	100

### Survival Outcome of Patients with Thoracic Injury

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Survive	176	89.8	235	89.4	237	88.8	234	91.8	275	94.2	1157	90.9
Died	20	10.2	28	10.6	30	11.2	21	8.2	17	5.8	116	9.1
Total	196	100	263	100	267	100	255	100	282	100	1273	100

### Thoracic Injury: Patients Receiving Pre-hospital Intervention

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
CDA	177	90.3	229	87.1	238	89.1	232	91.0	250	85.6	1126	88.5
Nil (private)	19	9.7	34	12.9	29	10.9	23	9.0	42	14.4	147	11.5
Total	196	100	263	100	267	100	255	100	282	100	1273	100

### Injury Severity Score for Patients with Thoracic Injury

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
1 to 8	68	34.7	100	38.0	89	33.3	81	31.8	105	36.0	443	34.8
9 to 15	56	28.6	66	25.1	76	28.5	86	33.7	87	29.8	371	29.1
16 to 24	33	16.8	37	14.1	41	15.4	34	13.3	42	14.4	187	14.7
25 to 49	30	15.3	49	18.6	48	18.0	43	16.0	47	16.1	217	17.0
50 to 74	5	2.6	8	3.0	9	3.4	7	2.7	8	2.7	37	2.9
75	4	2.0	3	1.1	4	1.5	4	1.6	3	1.0	8	1.4
Total	196	100	263	100	267	100	255	100	282	100	1273	100

### THORACIC INJURY PATIENTS: Body Region and Score for All Injuries Sustained

There was a total of 5,830 injuries for the group of 1,273 patients with thoracic injury. This table shows the injury severity score for each injury by Body region and sub-region.

Value of score codes

1 minor      2 moderate      3 serious      4 severe      5 critical      6 =maximum

Body Region	Sub-Region	1	2	3	4	5	6	Total
Head	Whole area	150	26	5		1	1	183
	Vessels, Intracranial			1	2	2		5
	Nerves, Cranial		9					9
	Internal organs			111	99	139	3	352
	Skeletal		33	56	9			98
	Level of consciousness	18	196	41	8	5		268
Total		168	264	214	118	147	4	915
Face	Whole area	357	31					388
	Vessels	4						4
	Internal organs	39	2					41
	Skeletal	97	133	14	2			246
Total		497	166	14	2			679
Neck	Whole area	46	5	2				53
	Vessels			1	1			2
	Internal organs	1	3	2	1			7
	Skeletal		1					1
Total		47	9	5	2			63
Spine	Cervical spine	10	35	23	2		3	73
	Thoracic spine	3	58	9		4		74
	Lumbar spine	5	81	14				100
Total		18	174	46	2	4	3	247
Thorax	Whole area	353	5	50	3			411
	Vessels		6	12	15	13	1	47
	Internal organs	1	9	276	56	43	4	389
	Skeletal	210	352	172	114	29		877
Total		564	372	510	188	85	5	1724
Abdomen and Pelvic contents	Whole area	200	3	3				206
	Vessels			9	9			18
	Internal organs	6	197	81	43	41	1	369
Total		206	200	93	52	41	1	593
Upper Extremity	Whole area	170	13	3				186
	Vessels		1	4				5
	Nerves	3	6					9
	Muscles-tendons-ligaments	8	7					15
	Skeletal-joints	39	28	1				68
	Skeletal-bones	19	290	62				371
Total		239	345	70				654
Lower Extremity	Whole area	251	29	6	1			287
	Vessels	2	1		1			4
	Nerves		1	1				2
	Muscle-tendons-ligaments		17	1				18
	Skeletal-joints	52	25					77
	Skeletal-bones	11	281	165	4	12		473
Total		316	354	173	6	12		861
External, burns	External-skin/subcutaneous	89						89
	Burns	2	2			1		5
Total		91	2			1		94
Grand Total (patients = 1,273)		2146	1886	1125	370	290	13	5830

## THORACIC INJURY PATIENTS

### Injury Description and Score for Thoracic Injuries Sustained

Injuries to the thoracic cavity totalled 1,724 for the group of 1,273 patients with thoracic injury. This table shows the number of patients sustaining each type of thoracic injury.

Value of score codes

1 minor      2 moderate      3 serious      4 severe      5 critical      6 =maximum

AIS Description	1	2	3	4	5	6	Total
<b>Injuries for Patients with Thoracic Trauma n=1,273</b>							
<b>Whole Area</b>							
Skin	315	2					317
Penetrating injury	38	3	7				48
Penetrating injury - with haemo / pneumothorax			43	3			46
Whole area Total	353	5	50	3			411
<b>Internal Organs</b>							
Trachea and Main Stem Bronchus			1		3		4
Bronchus distal to main stem	1			2			3
Haemo/pneumothorax			47				47
Heart (myocardium)			20	3	7	4	34
Pericardium		8	5				13
Intraventricular or intra-atrial septum					4		4
Oesophagus				2			2
Pleura		1	5				6
Lung contusion			127	34			161
Lung laceration			35	13	23		71
Pneumomediastinum			1				1
Tension pneumothorax					6		6
Thoracic injury: blood loss > 20%				2			2
Diaphragm			35				35
Internal Organs Total	1	9	276	56	43	4	389
<b>Skeletal</b>							
Rib cage contusion	38						38
Rib cage fracture	142	219	81	22			464
Rib cage fracture flail			8	39	15		62
Rib cage fracture with haemo/pneumothorax			83	53	14		150
Sternum contusion	30						30
Sternum fracture		133					133
Skeletal Total	210	352	172	114	29		877
<b>Vessels</b>							
Aorta, thoracic				3	10	1	14
Brachiocephalic artery			3	1			4
Coronary artery laceration					1		1
Other named artery/vein		6	4				10
Pulmonary artery/vein			2	8			10
Subclavian artery/vein			3	2			5
Vena cava, superior				1	2		3
Vessels Total		6	12	15	13	1	47
<b>Grand Total (patients = 1,273)</b>	<b>564</b>	<b>372</b>	<b>510</b>	<b>188</b>	<b>85</b>	<b>5</b>	<b>1724</b>

## ABDOMINAL INJURY ADMISSIONS TO LIVERPOOL HOSPITAL

800 patients were admitted to Liverpool Hospital with abdominal injuries during the 5 year period from 1995 to 1999. Patients with abdominal injuries were selected by including all patients who had AIS-90 coded injury in Abdomen and Pelvic contents as well as including 7 patients who had laparotomy with negative findings. 561 (70.1%) were males and 239 (29.9%) females. The mean age for patients was 32.5 years (range 1-99). Blunt injury accounted for 673 (84.1%) of patients with abdominal injuries and penetrating injury for 127 (15.9%). 721 (90.1%) received pre-hospital intervention and 79 (9.9%) arrived by private transport. Of this group of patients 731 (91.4%) survived and 69 (8.6%) died. The mean length of stay in hospital for patients with abdominal injuries was 11 days  $\nabla$  15 (1-213). For the 325 patients who were admitted to Intensive Care Unit (ICU) the mean length of stay in ICU was 5 days  $\nabla$  8 (1-84).

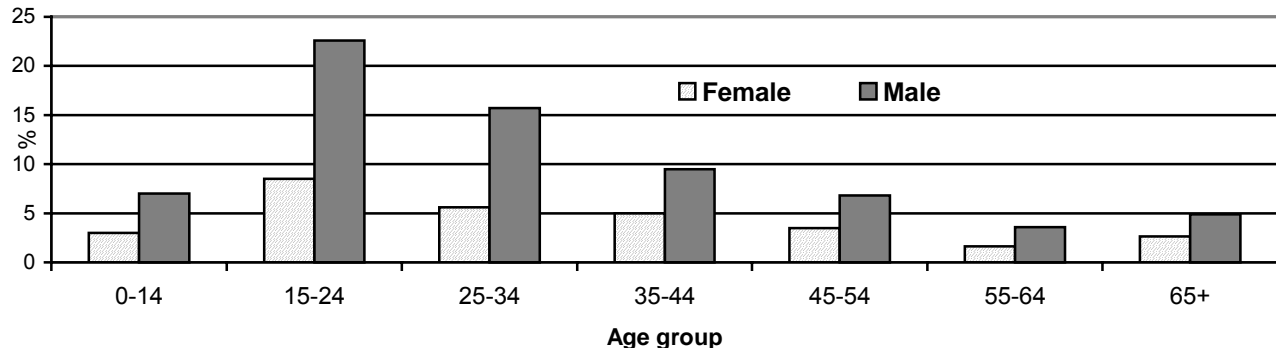
### Sex and Age Distribution for Abdominal Injury

Sex	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Males	93	71	116	72	113	71	112	69.1	127	68.6	561	70.1
Females	38	29	46	28	47	29	50	30.9	58	31.4	238	29.9
Total	131	100	162	100	160	100	162	100	185	100	800	100

### Annual Trends for Abdominal Injury: Age and ISS

	1995	1996	1997	1998	1999	Total
Age	29.5 $\nabla$ 18.1 (1-82)	33.6 19.9 (1-79)	32 $\nabla$ 16.4 (2-85)	32.7 $\nabla$ 15.9 (2-79)	33.8 $\nabla$ 18.8 (1-99)	32.5 $\nabla$ 17.9 (1-99)
ISS	17.9 $\nabla$ 17 1-75	16.5 $\nabla$ 16.4 1-75	18 $\nabla$ 16.6 1-75	13.6 $\nabla$ 13.7 1-75	16.7 $\nabla$ 16 1-75	16.5 $\nabla$ 16 1-75

### Abdominal Injuries: Age and Sex Distribution



### Mechanism of Injury and Outcome for Abdominal Injury

Mechanism	Survive	%	Die	%	Total	%
Road Vehicle	355	92.4	29	7.6	384	48.0
Motor Cyclist	49	87.5	7	12.5	56	7.0
Pedestrian/Cyclist	85	80.2	21	19.8	106	13.3
Blunt Assault	33	100	0	0	33	4.1
Stabbing	100	99	1	1.0	101	12.6
Gunshot	8	61.5	5	38.5	13	1.6
Industrial	32	94.1	2	5.9	34	4.3
Falls	52	92.9	4	7.1	56	7.0
Other	17	100	0	0	17	2.1
Total	731	91.4	69	8.6	800	100

### Type of Trauma for Patients with Abdominal Injury

Type	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Blunt	109	83	130	80	131	82	133	82.1	170	91.9	673	84.1
Penetrating	22	17	32	20	29	18	29	17.9	15	8.1	127	15.9
Total	131	100	162	100	160	100	162	100	185	100	800	100

### Origin of Arrival for Patients with Abdominal Injury

Origin	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Direct	126	96.2	152	93.8	147	91.9	150	92.6	161	87.0	736	92.0
Transfer	5	3.8	10	6.2	13	8.1	12	7.4	24	13.0	64	8.0
Total	131	100	162	100	160	100	162	100	185	100	800	100

### Injury Severity and Type of Trauma - Patients with Abdominal Injury

ISS	Blunt	%	Penetrating	%	Total	%
1 to 8	241	30.1	50	6.3	291	36.4
9 to 15	172	21.5	42	5.3	214	26.8
16 to 24	93	11.6	14	1.8	107	13.4
25 to 49	121	15.1	19	2.4	140	17.5
50 to 74	32	4.0	0	0.0	32	4.0
75	14	1.8	2	0.3	16	2.0
Total	673	84.1	127	15.9	800	100

### Survival Outcome of Patients with Abdominal Injury

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Survive	120	91.6	142	88	145	90.6	153	94.4	171	92.4	731	91.4
Died	11	8.4	20	12	15	9.4	9	5.6	14	7.6	69	8.6
Total	131	100	162	100	160	100	162	100	185	100	800	100

### Abdominal Injury: Patients Receiving Pre-hospital Intervention

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
CDA	116	89	148	91	146	91.2	147	90.7	164	88.6	721	90.1
Nil (private)	15	11	14	8.6	14	8.8	15	9.3	21	11.4	79	9.9
Total	131	100	162	100	160	100	162	100	185	100	800	100

### Investigations Performed Prior to Therapeutic Laparotomy

Therapeutic Laparotomy		Diagnostic Peritoneal Lavage							
		Not done	%	Positive	%	Negative	%	Total	%
CT Abdomen	Not done	91	36.0	77	30.4	10	4.0	178	70.4
	Positive	50	19.8	9	3.6	2	0.8	61	24.1
	Negative	7	2.8	6	2.4	1	0.4	14	5.5
Total		148	58.5	92	36.4	13	5.1	253	100

### Investigations Performed Prior to Non-Therapeutic Laparotomy

Non-Therapeutic Laparotomy		Diagnostic Peritoneal Lavage							
		Not done	%	Positive	%	Negative	%	Total	%
CT Abdomen	Not done	31	62.0	6	12.0	2	4.0	39	78.0
	Positive	7	14.0	1	2.0	0	0	8	16.0
	Negative	1	2.0	2	4.0	0	0	3	6.0
Total		39	78.0	9	18.0	2	4.0	50	100

A further 693 patients had either Abdominal CT or Diagnostic Peritoneal Lavage (DPL) and did not proceed to laparotomy operation. 427 had abdominal CT scan only, 199 patients underwent DPL only and 67 patients underwent both Abdominal CT and DPL.

**PATIENTS WITH ABDOMINAL INJURY: Body Region and Score for All Injuries Sustained**

There was a total of 3,787 injuries for the group of 800 patients with abdominal injury. This table shows the injury severity score for each injury by Body region and sub-region.

Body Region	Sub-Region	1	2	3	4	5	6	Total
Abdomen and Pelvic contents	Whole area	369	12	5				386
	Vessels			22	22	1		45
	Internal organs	20	379	182	73	62	3	719
Total		389	391	209	95	63	3	1150
Head	Whole area	79	13	2			2	96
	Vessels, Intracranial			1	3	2		6
	Nerves, Cranial		3					3
	Internal organs			55	42	56	1	154
	Skeletal		12	27	6			45
	Level of consciousness	15	107	27	8	4		161
Total		94	135	112	59	62	3	465
Face	Skeletal	59	63	8	2			132
	Whole area	214	22					236
	Internal organs	20	1					21
Total		295	86	8	2	0	0	391
Neck	Whole area	38	3	1				42
	Vessels			1	1			2
	Internal organs	1	2	1	1			5
	Skeletal		1					1
Total		39	6	3	2	0	0	50
Thorax	Whole area	134	2	12	1			149
	Internal organs	1	7	129	26	18	1	182
	Vessels		2	4	7	7	1	21
	Skeletal	62	92	52	47	18		271
Total		197	103	197	81	43	2	623
Spine	Cervical spine	9	26	8	1		3	47
	Thoracic spine	3	22	7				32
	Lumbar spine	2	55	19				76
Total		14	103	34	1	0	3	155
Upper Extremity	Whole area	109	10					119
	Nerves	3	2					5
	Vessels			1				1
	Muscles-tendons-ligaments	4	2					6
	Skeletal-joints	30	12					42
	Skeletal-bones	7	127	29				163
Total		153	153	30	0	0	0	336
Lower Extremity	Whole area	154	24	7				185
	Vessels	1	1	3	1			6
	Nerves		2					2
	Muscle-tendons-ligaments		11	1				12
	Skeletal-joints	28	17					45
	Skeletal-bones	5	177	111	5	11		309
Total		188	232	122	6	11	0	559
External, burns	Skin & subcutaneous tissue	53						53
	Burns	3		1		1		5
Total		56	0	1	0	1	0	58
<b>Grand Total</b>		<b>1,425</b>	<b>1,209</b>	<b>716</b>	<b>246</b>	<b>180</b>	<b>11</b>	<b>3,787</b>

Types of Injury Admitted - Liverpool Hospital

## PATIENTS WITH ABDOMINAL INJURY

### Injury Description and Score for Abdominal Injuries Sustained

Injuries to the abdominal cavity totalled 1,150 for the group of 800 patients with abdominal injury. This table shows each type of abdominal injury sustained by blunt or penetrating trauma and is displayed in descending order of frequency.

Value of score codes

1 minor                  2 moderate                  3 serious                  4 severe                  5 critical                  6 =maximum

AIS Description	1	2	3	4	5	6	Total
<b><i>Injuries for Patients with Blunt Trauma n=673</i></b>							
Skin abrasion, contusion, laceration	320	6	1				327
Spleen		67	15	17	25		124
Liver		76	12	7	13	3	111
Kidney		55	8	5	6		74
Jejunum-ileum		15	36	1			52
Mesentery		42	12	3			57
Artery or vein (including Abdominal Aorta)			13	16			29
Colon (large bowel)		27	12	2			27
Perineum, Vulva, Vagina, Rectum, Scrotum, Penis	15	7	2		1		25
Retroperitoneal haemorrhage			23				23
Duodenum		7		6	2		15
Bladder (urinary)		1		12			13
Urethra - Ureter		4	8	1	1		14
Pancreas		10	1	1	3		15
Omentum		6	2				8
Adrenal gland	2		1				3
Uterus-Placenta	1			2			3
Uterus-Placenta	1			2			3
Gall bladder		2					2
Stomach		1					1
Total for 673 Patients with Blunt Trauma	338	326	146	73	51	3	937
<b><i>Injuries for Patients with Penetrating Trauma n=127</i></b>							
Skin abrasion, contusion, laceration	49	6	3				58
Liver		19	4	2	4		29
Kidney		13	4	2	1		20
Colon (large bowel)		1	12	3			16
Artery or vein (including Abdominal Aorta)			9	6	1		16
Jejunum-ileum		6	8	1			15
Stomach		3	9	3			15
Spleen		7	1	3	3		14
Retroperitoneal haemorrhage			7				7
Omentum		6					6
Perineum, Vulva, Vagina, Scrotum, Penis, Anus	1	1	3	1			6
Pancreas		2		1	1		4
Duodenum			1		2		3
Mesentery		1	1				2
Ureter			1				1
Adrenal gland	1						1
Total for 127 Patients with Penetrating Trauma	51	65	62	22	12		213
Total for Patients with Abdominal Injuries	389	391	209	95	63	3	1150

### Organs Involved at Laparotomy and Type of Trauma

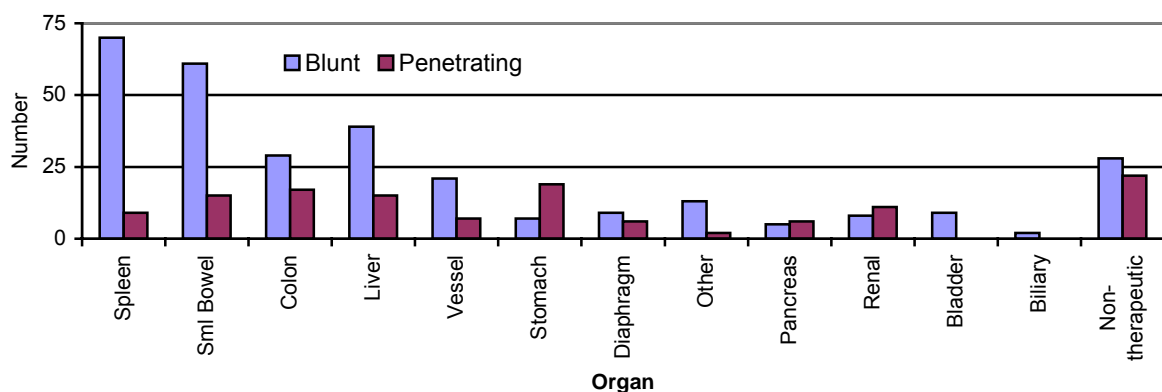
303 patients underwent Laparotomy. The following table represents the different organs (or anatomical elements) operated on following blunt or penetrating trauma.

Organ	Blunt	%	Penetrating	%	Total	%
Small bowel	61	20.2	15	11.1	76	17.4
Spleen <i>Removed</i>	46	10.5	7	1.6	53	12.1
<i>Repaired</i>	23	5.3	2	0.5	25	5.7
Liver	33	10.9	12	8.9	45	10.3
Colon	30	9.9	17	12.6	47	10.8
Stomach	7	2.3	19	14.1	26	5.9
Vascular	21	7.0	7	5.2	28	6.4
Renal/Ureteric	8	2.6	11	8.1	19	4.3
Diaphragm	9	3.0	6	4.4	15	3.4
Pancreas	5	1.7	6	4.4	11	2.5
Bladder/Urethra	9	3.0	0	0.0	9	2.1
Biliary	2	0.7	0	0.0	2	0.5
Other	13	4.3	2	1.5	15	3.4
Mesh Insertion	6	2.0	3	2.2	9	2.1
Skin	1	0.3	6	4.4	7	1.6
Non Therapeutic Laparotomy	28	9.3	22	16.3	50	11.4
<b>Total</b>	<b>302</b>	<b>100</b>	<b>135</b>	<b>100</b>	<b>437</b>	<b>100</b>

### Laparoscopy for Blunt and Penetrating Trauma

Trauma Type		1995	1996	1997	1998	1999	Total
Blunt	No laparotomy	-	1	-	1	-	2
Penetrating:	No laparotomy	6	4	7	7	1	25
	Non-therapeutic	-	-	1	-	2	3
	Therapeutic	-	-	1	4	-	5
<b>Total</b>		<b>6</b>	<b>5</b>	<b>9</b>	<b>12</b>	<b>3</b>	<b>35</b>

### Laparotomy for Blunt and Penetrating Trauma



## VASCULAR INJURY ADMISSIONS TO LIVERPOOL HOSPITAL

Patients with vascular injuries were selected by including all patients who had AIS-90 coded injury with Sub-region '2' in the following regions; Head, Face, Thorax, Abdomen and Pelvic contents, Upper and lower Extremities.

173 patients were admitted to Liverpool Hospital with vascular injuries during the 5-year period from 1995 to 1999. 154 (89%) were males and 19 (11%) females. The mean age for patients was 32.6 years (range 2-82). Of this group of patients 128 (74%) survived and 45 (26%) died. The mean length of stay in hospital for patients with vascular injury was 15.0 days  $\nabla$  24.9 (1-213). 76 patients spent at least one day in Intensive Care Unit. Of these 30 (39.5%) spent 1 to 2 days. The range was one to 84 days.

156 (90.2%) received pre-hospital intervention and 17 (9.8%) arrived by private transport. There was a total of 426 operations for the 173 patients with vascular injuries. 30 patients had operations in chest cavity, 22 patients had laparotomy, 42 patients had operation to extremity and 12 to other (eg face or external).

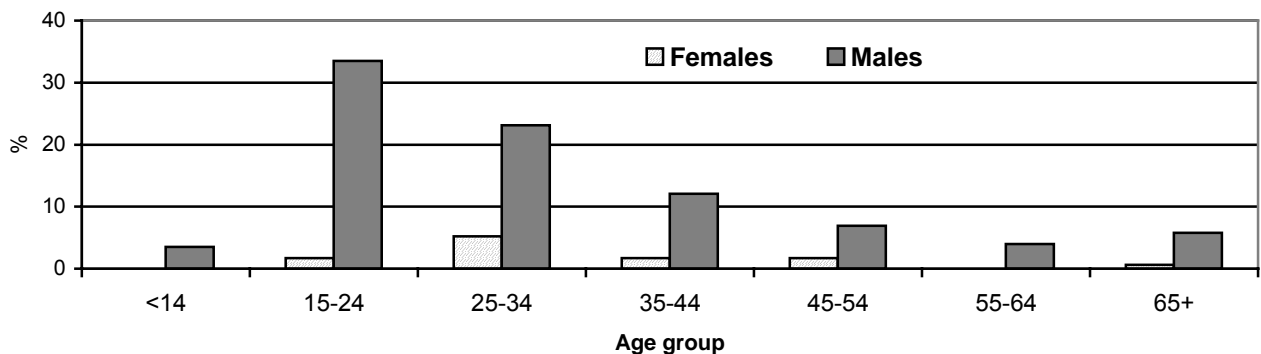
### Sex Distribution for Patients with Vascular Injury

Sex	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Males	22	78.6	30	90.9	37	94.9	31	91.2	34	87.2	154	89.0
Females	6	21.4	3	9.1	2	5.1	3	8.8	5	12.8	19	11.0
Total	28	100	33	100	39	100	34	100	39	100	173	100

### Annual Trends for Vascular Injury: Age and ISS

	1995	1996	1997	1998	1999	Total
Age	32.9 $\nabla$ 12.8	32.3 $\nabla$ 19.4	30.2 $\nabla$ 14.7	34 $\nabla$ 15.7	33.8 $\nabla$ 17.1	32.6 $\nabla$ 16
	15-72	2-79	4-79	13-76	13-82	2-82
ISS	19.6 $\nabla$ 16.8	22.7 $\nabla$ 20.4	20.8 $\nabla$ 13.3	22.6 $\nabla$ 21.1	31.9 $\nabla$ 23.9	23.8 19.8
	1-75	1-75	4-59	1-75	5-75	1-75

### Vascular Injuries: Age and Sex Distribution



### Type of Trauma for Patients with Vascular Injury

Type	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Blunt	15	53.6	17	51.5	20	51.3	19	55.9	29	74.4	100	57.8
Penetrating	13	46.4	16	48.5	19	48.7	15	44.1	10	25.6	73	42.2
Total Injuries	28	100	33	100	39	100	34	100	39	100	173	100

## VASCULAR INJURY ADMISSIONS

### Mechanism of Injury for Vascular Injury

Mechanism	Survive	%	Die	%	Total	%
Road Vehicle	30	65.2	16	34.8	46	26.6
Motor Cyclist	9	60	6	40	15	8.67
Pedestrian/Cyclist	7	50	7	50	14	8.09
Blunt Assault	17	94.4	1	5.6	18	9.8
Stabbing	33	82.5	7	17.5	40	23.1
Gunshot	5	50	5	50	10	5.8
Industrial	14	100	0	0	14	8.09
Falls	5	62.5	3	37.5	8	4.62
Other	8	100	0	0	8	4.62
Total	128	74	45	26	173	100

### Patients Receiving Pre-hospital Intervention

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
CDA	28	85.7	30	90.9	38	97.4	28	82.4	36	92.3	156	90.2
Nil (private)	4	14.3	3	9.1	1	2.6	6	17.6	3	7.7	17	9.8
Total	28	100	33	100	39	100	34	100	39	100	173	100

### Origin of Arrival for Patients with Vascular Injury

Origin	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Direct	27	96.4	32	97.0	35	89.7	31	91.2	35	89.7	160	92.5
Transfer	1	3.6	1	3.0	4	10.3	3	8.8	4	10.3	13	7.5
Total Injuries	28	100	33	100	39	100	34	100	39	100	173	100

### Injury Severity and Type of Trauma - Patients with Vascular Injury

ISS	Blunt	%	Penetrating	%	Total	%
1 to 8	7	4.0	14	8.1	21	12.1
9 to 15	24	13.9	33	19.1	57	32.9
16 to 24	15	8.7	8	4.6	23	13.3
25 to 49	31	17.9	15	8.7	46	26.6
50 to 74	18	10.4	0	0.0	18	10.4
75	5	2.9	3	1.7	8	4.6
Total	100	57.8	73	42.2	173	100

### Survival Outcome of Patients with Vascular Injury

Year	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Survive	22	78.6	22	66.7	29	74.4	27	79.4	28	71.8	128	74.0
Died	6	21.4	11	33.3	10	25.6	7	20.6	11	28.2	45	26.0
Total	28	100	33	100	39	100	34	100	39	100	173	100

Types of Injury Admitted - Liverpool Hospital

## VASCULAR INJURY ADMISSIONS

### Body Sub-Region and Score for All Injuries Sustained by Patients with Vascular Injury

There were 950 coded injuries for the patient group (173 patients) who sustained vascular injuries. There were 217 vessel injuries coded including 11 for cranial vessels. The following graphs represent the number of injuries to each body region with the corresponding sub-region and the number of injuries of different severities in each body sub-region.

### Body Region and Sub-Region for All Injuries Sustained by Patients with Vascular Injury

Body Region	Head	Face	Neck	Spine	Thorax	Abdomen and Pelvic	Upper Extremity	Lower Extremity	External, burns, other	Total
<b>Sub-Region</b>										
Internal organs	49	3	3		73	100				228
Level of consciousness	13									13
Cervical spine				10						10
Thoracic spine				6						6
Lumbar spine				6						6
Muscles-tendons-ligaments							22	8		30
Nerves	3						26	6		35
Skeletal-bones	7	18			42		47	100		214
Skeletal-joints							6	4		10
Vessels		8	14		53	47	42	42		<b>206</b>
Vessels, Intracranial	11									<b>11</b>
External-skin/subcutaneous	29	31	14		17	10	43	33	4	181
<b>Total</b>	<b>112</b>	<b>60</b>	<b>31</b>	<b>22</b>	<b>185</b>	<b>157</b>	<b>186</b>	<b>193</b>	<b>4</b>	<b>950</b>

### Body Sub-Region and Score

Body Sub-Region	Score	1 minor	2 moderate	3 serious	4 severe	5 critical	6 maximum	Total
Internal organs		1	45	83	46	50	3	228
Skeletal-bones		17	88	81	12	16		214
Vessels		37	18	85	50	15	1	206
Vessels, Intracranial				2	5	4		11
Whole area		121	34	21	1			177
Nerves		5	29	1				35
Muscles-tendons-ligaments		12	17	1				30
Cervical spine			5	3		1	1	10
Thoracic spine			5			1		6
Lumbar spine			5	1				6
Level of consciousness			7	6				13
Skeletal-joints		3	6	1				10
External-skin & subcutaneous tissue		4						4
<b>Total</b>		<b>200</b>	<b>259</b>	<b>285</b>	<b>114</b>	<b>87</b>	<b>5</b>	<b>950</b>

## VASCULAR INJURY ADMISSIONS

### Vessel Involved for Vascular Injuries and Score

Value of score codes

1 minor

2 moderate

3 serious

4 severe

5 critical

6 =maximum

AIS Description	1	2	3	4	5	6	Total
<b>Head or Neck</b>							
Internal carotid artery laceration					1		1
Internal carotid artery thrombosis (occlusion)				1			1
Jugular vein, external laceration - minor	2						2
Jugular vein, internal - laceration - minor		2					2
Middle cerebral artery thrombosis (occlusion)				1			1
Other artery (cerebral) laceration (or aneurysm)			1	3			4
Carotid (common, internal) artery laceration or (occlusion)			2	2			4
Carotid (external) artery laceration		1	3				4
External carotid artery branche(s) (facial, internal maxillary) lacerations	7		1				8
Vertebral artery laceration, or traumatic thrombosis/ aneurysm		1	2		2		5
Posterior cerebral artery laceration					1		1
<b>Thorax</b>							
Pulmonary artery - laceration			1	6			7
Pulmonary vein laceration			1	3			4
Subclavian artery			2	1			3
Vena cava, inferior laceration			3	6			9
Vena cava, superior and thoracic portion of inferior, lac'n major				1	3		4
Aorta, Abdominal				1	1		2
Aorta, thoracic - laceration				5	10	1	16
Axillary artery laceration minor		1					1
Axillary vein laceration major			1				1
Brachial artery laceration		1	14				15
Brachial vein laceration			1				1
Brachiocephalic (innominate) artery			3	2			5
Coronary artery laceration - (L main, R main or L ant.descending coronary sinus)					1		1
Other named arteries (eg. Oesophageal) lac'n		4	4				8
Other named veins (azygos, cardiac, hemiazygos, int. mammary)		2	1				3
<b>Abdomen Pelvic Contents</b>							
Coeliac artery laceration (perforation, puncture)			1				1
Other named art. (eg. hepatic, renal, splenic, sup.mesenteric)			10	5			15
Other names veins (eg. portal, renal, splenic, sup.mesenteric) - lac'n major			8	4			12
Iliac artery (common, internal, external) lac'n - major				4			4
Iliac vein laceration			1	3			4
<b>Extremities</b>							
Femoral artery laceration			2	6			8
Femoral vein laceration		2	2				4
Other named veins Upper Extremity laceration	4						4
Other names arteries Upper Extr laceration minor	11		9				20
Other names arteries, (distal to knee, small lower extrem)	8		4				12
Other names veins, laceration (eg. distal to knee, sml lower extremity)	5		5				10
Popliteal artery laceration (perforation, puncture)		3	3				6
Popliteal vein laceration (perf, punct)		1	1				2
<b>Total Vascular Injuries</b>	<b>37</b>	<b>20</b>	<b>85</b>	<b>55</b>	<b>19</b>	<b>1</b>	<b>217</b>

Types of Injury Admitted - Liverpool Hospital

## ORTHOPAEDIC INJURY ADMISSIONS TO LIVERPOOL HOSPITAL

### Minor category

To show the percentage of patients admitted under Orthopaedic specialty for Minor category injuries is simple and quick. Over 5 years 3,326 (61.2%) of patients admitted to Liverpool were admitted under Orthopaedic surgeons.

### Major category

The situation however for Major category injuries is less straightforward because most of the patients are admitted under more than one specialty. The specialty/specialties that patients are admitted under are not coded. Therefore in an attempt to estimate the proportion of patients who are admitted under orthopaedics and/or have orthopaedic consult I have counted the number of patients in each year who have any ais codes for "bone fracture" or "tendon injury" in the upper or lower extremity. This includes fractures in arms legs and pelvis but excludes rib fractures. I also included AIS codes for spinal fractures but excluded those with cord involvement. By using this logic I found there were 1984 (52.3%) patients admitted to Liverpool during the 5-year period with orthopaedic injuries.

### Total Patients with Orthopaedic Injuries Admitted to Liverpool

Therefore for all injury admissions to Liverpool 5,310 (57.6%) patients are admitted either solely under orthopaedic team or with orthopaedic involvement.

### All Patients Admitted with Minor Category Injuries

Hospital	1995	1996	1997	1998	1999	Total	Total %
Liverpool	1,039	1,109	1,072	1,138	1,073	5,341	31.6
Bankstown	898	723	864	768	766	4019	23.8
Campbelltown	667	780	607	646	658	3358	19.9
Fairfield	454	468	445	470	424	2261	13.4
Bowral	228	271	263	230	228	1220	7.2
Camden	154	119	164	151	104	692	4.1
Total	3,440	3,470	3,415	3,403	3,253	16,891	100

### Orthopaedic Admissions to Each Hospital with Injuries of Major Category

Hospital	1995	1996	1997	1998	1999	Total	%
Liverpool	353	363	411	413	412	1,984	54.5
Bankstown	79	44	130	142	162	557	15.3
Campbelltown	62	81	118	126	135	522	14.3
Fairfield	34	34	54	74	58	254	7.0
Bowral	32	25	53	69	68	247	6.8
Camden	4	11	32	20	12	79	2.2
Total	564	558	798	844	847	3643	100

Types of Injury Admitted - Liverpool Hospital

## ORTHOPAEDIC INJURY ADMISSIONS TO LIVERPOOL HOSPITAL

### Liverpool Hospital Specialty Admissions Patients in Minor Category

Minor Category	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
General surgery	107	10.3	135	12.2	112	10.4	164	14.4	147	13.7	665	12.2
Neurosurgery	28	2.7	22	2.0	11	1.0	25	2.2	12	1.1	98	1.8
<b>Orthopaedics</b>	<b>675</b>	<b>65.0</b>	<b>674</b>	<b>60.8</b>	<b>653</b>	<b>60.9</b>	<b>660</b>	<b>58.0</b>	<b>664</b>	<b>61.9</b>	<b>3326</b>	<b>61.2</b>
Plastic	179	17.2	240	21.6	261	24.3	263	23.1	212	19.8	1155	21.3
Faxiomaxillary	26	2.5	13	1.2	9	0.8	6	0.5	6	0.6	60	1.1
Other	24	2.3	25	2.3	26	2.4	20	1.8	32	3.0	127	2.3
Total	1,039	100	1,109	100	1,072	100	1,138	100	1,073	100	5,431	100
<b>Major Category</b>												
Orthopaedic	353	53.2	363	49.1	411	55.7	413	50	412	50	1,984	52.3
Non-orthopaedic	311	46.8	376	50.9	326	44.3	408	50	421	50	1,810	47.7
Total	664	100	739	100	737	100	821	100	833	100	3,794	100

### Origin of Major Category Patients Admitted to Liverpool Hospital with Orthopaedic injuries

Is Referred	1995	%	1996	%	1997	%	1998	%	1999	%	Total	%
Direct to Liverpool	318	90.1	323	89	373	90.8	384	89.1	362	85	1760	88.7
Transfer into Liverpool	35	9.9	40	11	38	9.2	47	10.9	64	15	224	11.3
Major Category Orthopaedics Total	353	100	363	100	411	100	431	100	426	100	1984	100

### Bankstown Hospital

Minor Category	1995	1996	1997	1998	1999	Total	Total %
General	101	55	106	60	51	373	9.3
<b>Orthopaedic</b>	<b>577</b>	<b>519</b>	<b>681</b>	<b>682</b>	<b>693</b>	<b>3,152</b>	<b>78.4</b>
Plastic	180	108	25	18	12	343	8.5
Other	40	41	52	8	10	151	3.8
Total	898	723	864	768	766	4,019	100
<b>Major Category</b>							
Orthopaedic	79	44	130	142	162	557	60.5
Non-orthopaedic	38	50	99	95	81	363	39.5
Total	117	94	229	237	243	920	100

### Campbelltown Hospital

Minor Category	1995	1996	1997	1998	1999	Total	Total %
General	83	123	96	86	46	434	12.9
<b>Orthopaedic</b>	<b>463</b>	<b>563</b>	<b>444</b>	<b>525</b>	<b>587</b>	<b>2,582</b>	<b>76.9</b>
Plastic	58	21	21	17	12	129	3.8
Other	63	73	46	18	13	213	6.3
Total	667	780	607	646	658	3,358	100
<b>Major Category</b>							
Orthopaedic	62	81	118	126	135	522	59.4
Non-orthopaedic	50	55	73	88	91	357	40.6
Total	112	136	191	214	226	879	100

Types of Injury Admitted - Liverpool Hospital

## ORTHOPAEDIC INJURY ADMISSIONS TO SWSAHS HOSPITALS

### Fairfield Hospital

Minor Category	1995	1996	1997	1998	1999	Total	Total %
General	62	41	68	56	35	262	11.6
<b>Orthopaedic</b>	<b>308</b>	<b>334</b>	<b>323</b>	<b>395</b>	<b>375</b>	<b>1,735</b>	<b>76.7</b>
Plastic	33	38	27	3	8	109	4.8
Other	51	55	27	16	6	155	6.9
Total	454	468	445	470	424	2,261	100
Major Category							
Orthopaedic	34	34	54	74	58	254	53.8
Non-orthopaedic	38	35	59	40	46	218	46.2
Total	72	69	113	114	104	472	100

### Bowral Hospital

Minor Category	1995	1996	1997	1998	1999	Total	Total %
General	73	62	44	37	37	253	20.7
<b>Orthopaedic</b>	<b>146</b>	<b>200</b>	<b>211</b>	<b>181</b>	<b>188</b>	<b>926</b>	<b>75.9</b>
Plastic	1	1	3	4	1	10	0.8
Other	8	8	5	8	2	31	2.5
Total	228	271	263	230	228	1,220	100
Major Category							
Orthopaedic	32	25	53	69	68	247	57.0
Non-orthopaedic	40	10	40	43	53	186	43.0
Total	72	35	93	112	121	433	100

### Camden Hospital

Minor Category	1995	1996	1997	1998	1999	Total	Total %
General	20	25	37	24	9	115	16.6
<b>Orthopaedic</b>	<b>42</b>	<b>41</b>	<b>85</b>	<b>111</b>	<b>87</b>	<b>366</b>	<b>52.9</b>
Plastic	43	30	25	9	3	110	15.9
Other	49	23	17	7	5	101	14.6
Total	154	119	164	151	104	692	100
Major Category							
Orthopaedic	4	11	32	20	12	79	51.6
Non-orthopaedic	11	9	24	20	10	74	48.4
Total	15	20	56	40	22	153	100

Types of Injury Admitted - Liverpool Hospital

## ORTHOPAEDIC INJURY ADMISSIONS TO SWSAHS HOSPITALS

### Urban and Rural Hospital: Disposition of Orthopaedic Injuries (Major Category Patients)

1,390 (83.8%) of patients with orthopaedic injuries remained in the urban or rural hospital.

#### Urban and Rural Hospital: Disposition

Hospital	Remain	%	Transfer Out	%	Total	%
Camden	18	22.8	61	77.2	79	100
Fairfield	225	88.6	29	11.4	254	100
Campbelltown	432	82.8	90	17.2	522	100
Bankstown	531	95.3	26	4.7	557	100
Bowral	184	74.5	63	25.5	247	100
Total	1,390	83.8	269	16.2	1,659	100

269 (16.2%) of the 1,659 patients with orthopaedic injuries admitted to the urban and rural trauma services within SWSAHS were transferred to another hospital for definitive care. 177 patients (65.8%) of the transfers were to another hospital within SWSAHS. Of these, 146 patients were transfers to Liverpool Hospital and 30 patients were transferred to Campbelltown Hospital. 48 patients were transferred to a hospital in another Area Health Service. 44 patients were transferred to a private hospital.

#### Destination of Orthopaedic Injuries Transfers from Urban Hospitals

Transfer From	To	Other AHS %	Private hospital %	Kept in SWSAHS %	Total Transfers %			
Camden	3	4.9	6	9.8	52	85.2	61	100
Fairfield	6	20.7	1	3.4	22	75.9	29	100
Campbelltown	18	20.0	3	3.3	69	76.7	90	100
Bankstown	12	46.2	3	11.5	11	42.3	26	100
Bowral	9	14.3	31	49.2	23	36.5	63	100
Total	48	17.8	44	16.4	177	65.8	269	100

Types of Injury Admitted - Liverpool Hospital