THE IMMEDIATE CARE OF ROAD TRAFFIC AND TRACTOR CASUALTIES IN A RURAL AREA

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HOSPITAL services for the treatment of the seriously injured have been the subject of several reports. These have been published by *inter alia*, the Nuffield Provincial Hospital Trust (1960), the British Orthopaedic Association (1959), a subcommittee of the Standing Medical Advisory Committee (1962) and most recently by the Accident Services Review Committee of Great Britain and Ireland (1965). These and other similar reports, Parry *et al.* (1962) and Fry (1960), have been concerned primarily with the status, staffing, function or re-organization of accident services in large general hospitals. They place a considerable emphasis on the care of patients in major accident units and are characterized by an almost complete absence of reference to the management of casualties outside these units or to the care of patients during transportation to hospital. Howard (1965) has shown that no work has been done in this country to show what happens to these casualties before they arrive in hospital and the paucity of data about those casualties who have reached hospital has been noted by a committee of the Nuffield Provincial Hospital Trust (1960). Some account of the local management, transport and ultimate disposal of people injured in motor-vehicle accidents in a relatively isolated rural area would appear to be relevant and is the subject of this paper.

Sources

In this area it is customary for the general practitioners to go to all serious accidents and a call to an accident usually takes precedence over whatever else the practitioner may be doing. Details of these accidents have been recorded in a number of different though interrelated sources. These sources are

1. the practice records
2. the local cottage hospital inpatient and outpatient records
3. the police road traffic accident reports
4. the coroner's records
5. the local ambulance log-book.

An analysis has been made of these records for the four and a half

years from 30 June 1960 to 31 December 1964.

Results

During the period under review there were 124 road traffic and tractor accidents in an accident catchment area of about 110 square miles. Two hundred and one people were injured; 11 of these were killed, 80 seriously injured and 110 received minor injuries. Eighty-nine other people who were involved in the accidents escaped unhurt. Two general practitioners were called out to 49 of these accidents and a third attended one other casualty at the site of accident. Ninety-eight (48.2 per cent) casualties were treated at the site of accident and another 63 (31.3 per cent) were treated by the local doctors in their surgery or at the cottage hospital: 39 (19.4 per cent) casualties received injuries which were so trivial that they did not require medical care and were not seen by a doctor.

Table I shows where the different types of casualty were first seen. It shows that all the fatally injured and most of the severely injured casualties were seen by a general practitioner at or near the site of

TABLE I

SITE AT WHICH DIFFERENT TYPES OF CASUALTY WERE FIRST SEEN BY LOCAL DOCTOR

	Fatal	*Serious*	*Slight*	*Total*
At site of accident ..	11	54	32	97
In hospital	—	22	28	50
In surgery	—	2	11	13
Not seen	—	2	39	41
Total	11	80	110	201

accident. Of the 41 casualties not seen by a local doctor only two had injuries which could be classified as serious, using the criterion of severity defined in Road Accident Statistics (1964). One of these had a fractured fibula and the other fractured ribs.

The main sites of injury of the 91 people fatally and seriously injured in these accidents and the relative severity of the different types of road traffic and tractor accidents have been reported elsewhere (Rees 1965). Eight people were found dead at the site of accident. Three others died after they had been admitted to hospital. Two had mid-brain injuries and died in Llanidloes; both were seen soon after the accident by consultant surgeons. The third was injured in a tractor accident. He had multiple injuries which included a fracture dislocation of the lumbar vertebrae and a ruptured liver. He was given intravenous plasma and blood and transferred to an

orthopaedic unit. A few days later he became uraemic and was then admitted to an artificial kidney unit, where he died nine days after the accident. No person died in transit from the site of accident. Although the figures are small they compare favourably with the results obtained in Birmingham hospitals. Gissane and Bull (1962) have published figures which show that in the City of Birmingham 30 per cent of the people fatally injured in road accidents during 1960–61 were killed outright, 20 per cent died within six hours and the remaining 50 per cent survived a longer period. They state that approximately one half died in hospital and this by implication means that about 20 per cent died in transit. It is possible that their in-transit death rate is less than 20 per cent but in that case the hospital mortality rate is proportionately higher. The Llanidloes figures of 73 per cent fatally injured at the site of accident, no deaths in transit and a 27 per cent hospital mortality rate look very good in comparison. Some relevant data of the eight people found dead at the site of accident are given in table II. The mortality rate for all

TABLE II

CASUALTIES FOUND DEAD AT THE SITE OF THE ACCIDENT

Vehicle	*No.*	*Site*	*Witnessed*	*Casualty*	*Remarks*
Car	1	A. Road	No	Driver	Subdural, subarachnoid and cerebral haemorrhages. Fractured pelvis, dislocated hip.
				Passenger	Fractured skull and femur.
				Passenger	Fractured skull and femur.
Car	2	A. Road	Yes	Driver	Fractured skull and C.7. Died immediately.
Car	3	A. Road	No	Driver	Fractured C.5 with pulping of spinal cord.
Motorcycle	1	B. Road	Yes	Driver	Fractured skull. Died immediately.
Tractor	1	Isolated field	No	Driver	Found crushed beneath overturned tractor.
Tractor	2	Farmyard	No	Driver	Found crushed beneath overturned tractor.

The coroner did not require an autopsy on the passengers in car 1 and the injuries recorded for the passengers were those apparent on external examination only.

the road traffic and tractor casualties admitted as inpatients to Llanidloes Hospital or transferred to specialist units was 4.7 per cent. This figure compares favourably with the eight per cent mortality

rate recorded by Gissane and Bull (1962) for road casualties admitted to the Birmingham Accident Hospital.

Disposal

The disposal of the casualties transferred to specialist units is shown on the map of Wales (figure). Llanidloes is situated in a most central position in mid-Wales. The area is hilly and much of it is

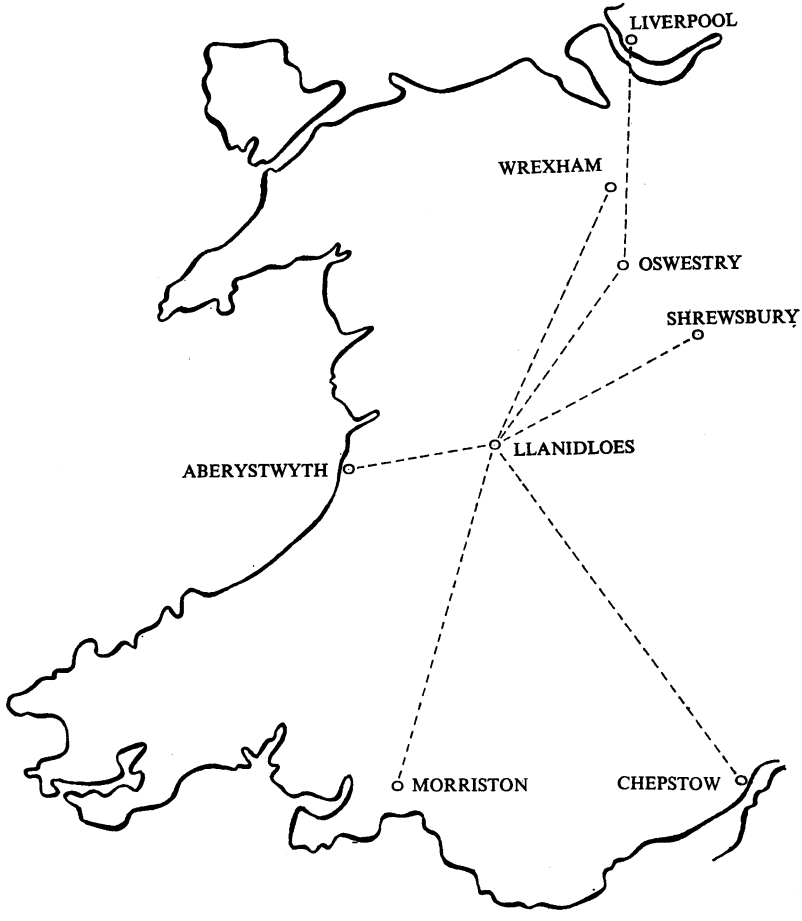

Figure
SPECIALIST CENTRES TO WHICH CASUALTIES WERE TRANSFERRED

designated as an area of special difficulty for the purpose of rural practice mileage payment. The nearest major general hospital is at Aberystwyth, 30 miles away, whilst the nearest plastic-surgery unit (at Chepstow) is over 90 miles away. Twenty-seven casualties were

transferred to these or to the other specialist units shown on the map. Thirty-seven other casualties were admitted to Llanidloes Hospital. Most of the people transferred from Llanidloes went either to Aberystwyth General Hospital (12 patients) or to the orthopaedic unit at Oswestry (nine patients). Two patients with severe burns were admitted to Chepstow and two children with head injuries were sent to Wrexham and Shrewsbury respectively. One patient was admitted to the neurosurgical unit at Morriston. He was an elderly pedal cyclist who was knocked down by a fast moving car, who had a fractured skull and later developed a subdural haematoma which was evacuated. Over half the casualties (58.2 per cent) did not normally reside in the Llanidloes area. In some instances, the specialist centre to which casualties were transferred was determined by their normal place of residence.

Transportation

It is apparent from the map that the distances casualties have to travel in transit to other hospitals are considerable. These journeys are made by ambulance, though on one occasion in the past decade a severely injured casualty was transferred by helicopter. Arrangements which were made more recently to fly out a second casualty were cancelled because the helicopters were grounded by bad weather.

The ambulance service in this county is unique in that it is manned entirely by volunteers engaged in full-time alternative employment. All the ambulance drivers are members of the St John Ambulance Brigade and receive their first-aid training from one of the local doctors. It is a point of interest that although these men are immediately available for all emergencies only half the casualties who required transport were conveyed from the site of accident by ambulance. The different types of vehicle used to convey the other casualties from the site of accident are listed in table III. Only one of the 80 people whose injuries were classified as serious failed to obtain transport to hospital. This was a young motor-cyclist who fractured his collar-bone at 4.45 a.m. and walked a distance of about one mile to hospital. It would appear from figures published by the Standing Medical Advisory Committee (1962) that in other areas a much lower percentage of casualties obtain transport to hospital. The committee report that data obtained from 789 hospitals showed that only 30 per cent of 10,961 patients with fractures and 74 per cent of 1,788 patients with multiple injuries were taken to hospital on their first attendance by ambulance or other transport. Although these figures do not apply specifically to road accidents it is likely that they do reflect the extent to which road accident casualties in other areas obtain transport to hospital.

Some of the more severely injured patients were conveyed in the

TABLE III

TYPE OF TRANSPORT USED TO CONVEY PATIENT FROM SITE OF ACCIDENT

Vehicle	*No. of casualties carried*	*No. of journeys*	*Total mileage travelled*	*Average mileage travelled*
Ambulance	65	35	269	8
Doctor's car	10	10	21½	2
Police car	3	3	19	6
A.A. car	1	1	6	6
Other cars	23	16	70	4
Vans	7	6	19	3
Landrover	5	4	18	4½
*Tractor	2	2	1	½
Bus	3	2	19	9½
Minibus	4	1	4	4
Total	123	80	446½	5

*The tractors were used to convey casualties to nearby farmhouses and thence by ambulance to hospital.

The ambulance also travelled an additional 956 miles, transferring casualties to other units.

less elegant vehicles. A young man with a fractured pelvis was taken home on a tractor-drawn trailer and a child with a fractured femur and humerus brought to hospital in a land-rover. Sometimes prompt unconventional transport can be safer than waiting for ambulances engaged elsewhere or standing in some distant garage. One young man was conveyed for about four miles on the floor of a van. His injuries included fractures of the skull, mandible, six ribs and both femurs. He was one of six people severely injured in a multiple car crash in which 12 people were hurt. They were admitted to Llanidloes Hospital where primary resuscitative treatment was commenced, whilst an orthopaedic flying squad hurried from Aberystwyth to undertake the definitive management of their injuries. The one person who died as a result of this accident was a 19-year-old girl with a mid-brain injury.

Doctor availability and function

The immediate management of motor vehicle casualties can absorb a considerable part of a general practitioner's day and some indication of the normal work load undertaken by the doctors who attended casualties at the site of accident is relevant. Table IV gives the relationship between the number of accidents attended for each day of the week and the ordinary practice work done on that day by the doctor who attended the accident. The work loads for Tuesdays to Fridays are artificially low as these include many ' half days '. The most interesting results are recorded for Saturdays. This is the

busiest day of the week for members of this practice as well as being the day on which road accidents are most likely to occur. At the time of the survey, surgeries were held on Saturday mornings, afternoons and evenings and it was not unusual for doctors to see over 100 patients in a day. Table IV shows that about 80 people

TABLE IV
ROUTINE PRACTICE WORK ON DAYS OF ACCIDENTS

Accidents visited	*Routine practice work*					
	Miles travelled		*Patients seen*			
	Total	*Average*	*Total*	*Average*	*Lowest number*	*Highest number*
Sunday 7	216	31	73	10	5	20
Monday 5	156	31	190	38	20	49
Tuesday 7	252	36	229	33	21	42
Wednesday 4	122	30½	125	31	6	43
Thursday 7	276	40	218	31	14	48
Friday 9	233	26	333	37	22	56
Saturday 11	379	34½	885	80	64	120
Total 50	1,634	32½	2,053	41	—	—

were seen each Saturday by the doctor called to the accident and that he had to travel over 32 miles in the course of his normal practice work. Despite this very heavy work load, whenever a request was received to attend an accident, that accident was visited immediately, even though it meant leaving peremptorily a surgery full of waiting patients.

The main function of the doctor at the site of accident was to supervise the first aid management of the patient and to give I.V. analgesics when necessary. Transfusion kits were sometimes taken to accidents but during the period under review they were never used at the site of accident. It was usually found safe and more convenient to transfer the patient to the local hospital and then give I.V. transfusions if these were required. Occasionally, however, an immediate transfusion at the site of accident is necessary and this has been done twice in this area in the years immediately preceding the period under review.

Summary

Details are given of the local management, methods of transport and ultimate disposal of people injured in motor vehicle accidents in a relatively isolated rural area in Montgomeryshire. Of 201 people injured in road traffic and tractor accidents, 98 (48.2 per cent) were attended by general practitioners at the site of accident and 63 (31.3 per cent) others were treated by the local doctors in their surgeries

or at the cottage hospital. Only two (one per cent) casualties received their initial medical treatment outside the practice area. Thirty-nine (19.4 per cent) casualties received injuries which were so trivial that they did not require medical care and were not seen by a doctor. Eighty-nine other people who were also involved in the accidents escaped unhurt.

Seventy-three per cent of the people fatally injured were found dead at the site of accident, 27 per cent died in hospital and there were no deaths in transit. The mortality rate for all the road traffic and tractor casualties admitted to the local hospital or transferred to specialist units was 4.7 per cent. These figures compare favourably with those published for hospitals in Birmingham.

The ambulance service in Montgomeryshire is unique in Great Britain. It is manned entirely by volunteers engaged in full-time alternative employment. Over half of those casualties who required transport from the site of accident were conveyed by ambulance; the remainder were transported in various other types of vehicle which are described. Almost 100 per cent of those casualties who had more than minor injuries obtained transport to hospital. It is suggested that a much higher proportion of road accident casualties obtain transport to hospital in this area than in other parts of England and Wales.

Of the casualties 58.2 per cent did not reside in the area. Because the care of these casualties is additional to the normal work done by general practitioners an indication is given of the amount of ordinary practice work done on these occasions by the doctors attending casualties at the site of accident.

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