

Epidemiology

188. Pedestrian accidents, injuries and care in North West Britain

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160 serious pedestrian accidents (ISS>15 or Death), were identified during a 12 month prospective study of all trauma in a population of 3.2 million. 35 died at scene, 125 arrived at hospital alive and 68 (54%) subsequently died. 35 (22%) were children and 62 (39%) aged greater than 60 years. The Median ISS values were similar between the age groups. RTS and APACHE II showed significant differences between those that lived and died. TRISS analysis revealed that 32% of deaths and 12% of survivors were unexpected. Head injuries were more severe and common in children, whilst chest injuries were more common in adults and the fatally injured elderly. Abdominal injury was rare.

Ambulance prehospital care was inadequate, with only small volumes of IV fluid given and less than half of the unconscious patients had a cervical collar applied. Pre-hospital care significantly delayed transit to hospital. In A+E only 38% of those unconscious had a cervical collar applied, and only 66% were intubated. Of those transferred for neurosurgical care 33% were not intubated.

Analysis of police accident statistics showed that 17% of these cases had not been recorded. 90% of accidents were due to pedestrian behaviour, only 34% of involved drivers were breath tested and elevated blood alcohol among victims was uncommon.

Children with Head or Multiple Injuries and the elderly with Chest Injury are most at risk following pedestrian accidents. ATLS treatment protocols should be instituted in all A+E Departments.

Changes in vehicle design, public education or physical separation of cars and pedestrians may reduce the frequency and severity of accidents.

189. Injury patterns in motorcycle road-racers

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Introduction: Motorcycling is a high risk activity. In 1989 there were 42,630 motorcyclists injured in the United Kingdom, of which 11,805 were seriously injured and 683 were killed. The pattern of injuries in motorcyclists as a group has been well documented but there have been no prospective studies of injuries sustained by road-racing motorcyclists. This paper documents all injuries sustained by road racers during a three year period of racing on the Isle of Man, the world's foremost road-racing circuit. The

results are compared with previous studies of motorcycle injury to determine whether there is any difference in injury patterns and to define the relative risks of road-racing.

Materials and methods: The Isle of Man is a small island in the middle of the Irish Sea. Each year it hosts two meetings, the international Tourist Trophy and the amateur Manx Grand Prix. These events take place over 37.73 miles of closed public roads. The meetings consist of a weeks practice and a weeks racing. The lap record stands at 123.48 M.P.H. achieved during a six lap Formula One race. A maximum speed of 198 M.P.H. is reached on the fastest part of the circuit. During the study period a total of 1,464,129 miles were covered, plenty of opportunity to fall off! If the riders did fall off they were taken by helicopter to Nobles Hospital. Details of their age, sex, vehicle type, nature of injury and management received were recorded.

Results: Approximately 2,500 riders took part with a total of 175 casualties. There were 16 deaths, 9 at the roadside and 7 deaths after arrival in hospital. 93 of the 166 riders who arrived at the hospital alive required admission. The remaining 73 were treated in the Accident and Emergency Department and discharged. The mean age of the injured was 34.3 (18-74) years. There were 3 females and 26 sidocar riders. The injuries sustained fell mainly into three categories; head injury (41 riders), significant soft tissue injury (114 riders) and 187 fracture or fracture dislocations. The injury patterns and their management will be discussed. Although 25% of the injured sustained a head injury only 4 riders had a skull fracture. This supports the view that the helmets worn are extremely effective despite the very high speeds attained and the close proximity of the usual public road obstacles. Spinal injury was uncommon possibly due to the use of spinal protectors. There was a preponderance of limb injury of which 20% were compound injuries. Only two riders required a laparotomy. The injury rate was 1 rider per 8,370 miles and the fatality rate was 1 rider per 91,500 miles.

190. Badminton injuries

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Introduction: Participation in all kinds of sports activities has increased considerably during the last decades. In Denmark there is an old tradition for badminton. The game is played at all levels, and there have been only a few good epidemiologic studies (1). Most studies have been carried out as case-series or insurance-claim reports. Furthermore, most studies are not population-based and do not reveal the socio-economic or other subsequent consequences to the players.

Materials and methods: During one year 100 badminton players, 5 per cent of all sports injuries, were prospectively

registered and treated in the casualty ward of Randers City Hospital. Afterwards questionnaires were sent to all participants, three times if necessary. Eighty-nine percent answered the questionnaires. In the same year all active sports participants in the hospitals uptake area (30,254) were registered according to their sport affiliation (2,620 badminton players).

Results: There was an almost equal sex distribution (58 percent men and 42% women). The mean age was 30 for male players and 25 for female players. Fifty-five percent of the injuries occurred in club players, the rest of the accidents were found in company and school sports. In the hospital uptake area there were 2,620 active members of badminton clubs (1,650 men and 970 women). The active players were registered in three groups according to age: Group 1: <18 years: 31%; Group 2: 18–25 years: 16%; Group 3 >25 years: 53%. According to the Abbreviated Injury Scale (A.I.S.) 17% were classified as minor, 56% as moderate, and 27% as severe, respectively. Fifty-six percent of the severe injuries (A.I.S. = 3) were found in group 3. Nine players reported that earlier injuries had influenced the actual accident. Most of the injuries occurred in the time interval between 11–60 minutes after onset of the game. Most players (86%) trained 1–3 times weekly. Distorsions were the most common diagnosis (56%), fractures accounted for 5%. Tears of ankle ligaments were found in 12%, and 14% had achilles tendon tears. One percent had a dislocation of the humeroglenoid joint. The hospitalization rate was found to be 21%. None of the patients treated as in-patients spent more than 7 days in hospital. In the age groups 2 and 3, 43% were absent from work due to the injury—25% for more than 3 weeks. The accident caused unemployment to one person. Another player was forced to change work due to the injury. Ten percent of the players stopped their sport after the accident, and only three percent regained their training/sport within one week. As much as 23% had to refrain from regular training and matches for 8 weeks.

Acknowledgement: This study was supported by the Danish Medical Research Council (project No. 1535 & 1839). Thanks to the Danish Sports Association for providing the data for the number of active sports participants.

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191. Epidemiology of surgically treated meniscal lesions in the knee

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In a suburban area of Copenhagen with approximately 620,000 inhabitants during the three years of 1982–1984 all surgically treated meniscal lesions of the knee joint were recorded. All operations in this study were open. The three years selected have been carefully chosen, since arthroscopic surgery performed in private clinics preventing reliable epidemiological analysis was introduced the following years.

The overall incidence of meniscal lesions per 10,000 inhabitants per year was 9.0 in men and 4.2 in women. The highest incidences were seen in the 3rd, 4th and 5th decades of age. A higher frequency of trauma related to onset of symptoms was observed in men (77%) than in women (64%; $p < 0.001$). The bucket handle lesion was the most frequent type of meniscal lesion in men (35%) whereas peripheral detachment was the most frequent type in women (41%).

Varying frequencies of trauma inducing the lesions in men and women did not explain the sex-differences in type of lesion ($p < 0.01$). 19% of the 1,215 patients in this study were treated with partial meniscectomy while 0.7% had meniscal repair performed. These figures will increase with time and possibly reduce the frequency of arthrosis following meniscus surgery.

192. The incidence of femoral neck fractures in women is decreasing

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Introduction: The incidence of hip fractures in the population over 55 years in Uppsala County was calculated for the years 1980 to 1990.

Material: All patients over 55 years of age treated for hip fractures, femoral neck as well as trochanteric (ICD-9

classes 820.A to D), were registered prospectively. Demographic data concerning the population was obtained from official statistics of the County Administration.

Methods: Specific incidences were calculated for each age, sex, and fracture type groups. The time trend for the change in incidence was calculated for each group with linear regression using an exponential model ($y=ea+bx$).

Results: The over all incidence in hip fractures in both sexes over 55 years, standardized to the 1985 population, remained steady at 6/1000 over the study period. The incidence of femoral neck fractures in women showed a significant decrease in all age groups except over 85 years of age, where the incidence was constant. The incidence of femoral neck fractures in men did not change over time. Trochanteric fractures increased in men between 65 and 74 years and in women over 85 years. The incidences of trochanteric fracture in the rest of the age and sex groups remained unchanged.

Conclusions: The total number of hip fractures increased due to an increase in the elderly population. The specific incidence in most age and fracture type groups did not change over the studied period. The incidence of femoral neck fractures in women decreased.

193. Increasing incidence of hip fractures in middle Finland in 1970–1989

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The aim of this study was to analyze the current incidence and to estimate the future number of hip fractures in Middle Finland health care region (5% of Finland's population).

Methods: The increase of hip fractures since 1970 was counted from an earlier study (1). The material of 1989 was analyzed for age, sex, type of fracture and duration of stay in hospital. The population at risk during the observation period was registered and an official population forecast was used.

Results: In 1970, a total of 53 hip fractures were admitted. During 1989, the corresponding number was 199. The increase was 275%. From 1970 to 1989 the total incidence of hip fractures in women increased from 34 to 118 (247%) and in men from 8 to 39 (388%) per 105 inhabitants. In both sexes the incidence increased exponentially with age. In 1989, 70% of all hip fractures were cervical and 30% trochanteric. 77% of these fractures occurred in patients aged 80 years and above. In 2010, the number of patients with hip fractures is estimated to be 656 (increase from 1989 by another 230%).

Conclusions: During 1979–1989, the number of hip fractures nearly quadrupled. The total number of hip fractures in 2010 will be 656 if the observed rise in age-specific incidence continues.

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194. Decreasing numbers and lower levels of amputation—a preliminary 10-year report

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Background: In Sweden, like in other Western countries, the number of amputations for peripheral vascular disease, with or without diabetes, has dramatically increased during this century. A previous study showed a tenfold increase from 1910 to 1979 in the county of Malmöhus. During the 1980's a mounting interest was focused on prevention and treatment. A number of new surgical and angioplastic techniques have been introduced and multidisciplinary programs for the prevention and treatment of diabetic foot ulcer were introduced in many centres. In the district of Lund-Orup, a comprehensive program has been in operation since 1982. This study was undertaken to evaluate the development with regard to amputations during this time.

Material and method: Hospital and, when necessary, primary health care records of all patients amputated at the University Hospital of Lund 1982–1991 have been studied retrospectively. A total of 896 major or minor amputations were recorded. Forty-nine per cent of the amputations were associated with diabetes.

Results: The amputations at all levels have been studied and compared in 2-year intervals. The numbers decreased from 219 in the first 2-year period to 135 during the last 2 years. Up to date, the number of amputations above ankle level decreased by 45–50% (11 patients not yet healed). The rate of reamputation from below ankle to below knee or higher showed, with the same reservation, a decrease from 37% to 17% over the same time.

Conclusion: This study has shown a decreasing amputation rate in the 1980's and also lower levels of amputation as well as a marked reduction in re-amputation rate. More active vascular surgery and a multidisciplinary approach to the prevention and treatment of diabetic foot ulcer, are most likely contributing factors to this development. We believe, however, that changing attitudes towards amputation might also play an important role.

195. Incidence of gunshot injuries affecting the skeleton in Finland 1985–1989

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Introduction: When surveying the data available on the mortality and morbidity caused by civilian use of fire arms, striking differences are found within the Western world. In the Nordic countries gunshot injuries have traditionally been regarded as a minor problem. The present study was undertaken to assess the true magnitude of the workload caused by these injuries in orthopedic trauma departments.

Patients and methods: Over a 5-year period 1985–1989, data was collected of all patients treated in hospital in Finland for gunshot injuries by using the statistics of the Central Medical Board. This information was analyzed for demographic details and from a hospital resources expenditure point of view, with special attention to gunshot injuries to the long bones. Patients dead on admission were not included.

Results: The skeleton, skull and facial bones excluded, was affected in 169 out of a total of 1268 hospital in-patients during the 5-year period. Accidental gunshots comprised the majority, 66%, followed by domestic conflicts and assaults, 19%. The male:female ratio was 11:1. The median age of the patients was 31 years. The distribution according to the principal skeletal injury was as follows: spinal column 22, pelvis 2, scapula 2, humerus 12, bones of the forearm 22, bones of the hand 13, femur 57, bones of the lower leg 21 and bones of the foot 18 patients. The mean $\pm$ SD duration of the hospital stay was 13.9 $\pm$ 4.5 days. The longest average hospital stay was recorded for gunshot fractures of the tibia, 20.1 days.

Conclusion: From this study the incidence of long-bone fractures caused by gunshot in Finland can be estimated at 5 patients per one million person-years. On the whole, the total number of gunshot injuries in Finland seemed to be somewhat higher than has recently been reported from the other Nordic countries.

196. A comparative population study to examine the possible genetic basis of primary hip osteoarthritis

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Does primary osteoarthritis of the hip among Asians, Blacks and Hispanics occur with the same or different incidence in

San Francisco as it does in the native countries of these people?

A retrospective survey was conducted that identified all patients who had undergone a total hip replacement in San Francisco during the 5-year period, 1984–1988, and were also residents of San Francisco. All of these patients were categorized by race, sex, and age. The patients who had had their operation during the last six months of the study period were categorized by specific hip disease after examination of their preoperative pelvic radiograms; in cases of osteoarthritis, patients were further categorized by the specific pattern of this disease. San Francisco census data were used to calculate the incidences of total hip replacement for osteoarthritis and for any indication, by race, sex, and age.

During the 5-year study period, 1,617 residents of San Francisco had undergone a total hip replacement in San Francisco. The diagnosis of osteoarthritis was made in 70% of the white patients, in 47% of the Hispanic patients, in 44% of the Black patients, and in less than 32% of the Asian patients. The following standardized rates of primary hip osteoarthritis, expressed in number of cases per 100,000 population per year, were obtained: Japanese, 1.5; Chinese, 1.5; Filipino, 1.6; Hispanic, 5.1; Blacks; 8.3; Whites, 29.4.

Conclusion: The high rate of primary hip osteoarthritis among white patients and the low rates among the nonwhite groups in San Francisco are supported by previous studies of these groups in their native countries. Primary osteoarthritis of the hip is largely a disease of white patients and very probably has a genetic basis. The comparison of cultural similarities and differences and body size among these races argues against load factors or occupation in the etiology of this disease. The low prevalence of this condition among Blacks is comparable to the proposed white gene frequency in Blacks, as determined by Duffy blood group factors. The rarity of this condition among Asians could be explained on the basis of genetic mutation, while the slightly higher rate among Hispanics might be the result of transmission of the gene through intermarriage with Northern Europeans.

197. The prevalence of gonarthrosis in former soccer players and its relation to meniscectomy

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The prevalence of radiographic signs of gonarthrosis and its relation to knee injuries was studied in 286 former soccer players and 572 age-matched controls with a mean age of 55 years. The prevalence of gonarthrosis in the controls was

1.6%, in the whole group of soccer players 7.0% and in the elite players 15.5%. Seven of the soccer players had known anterior cruciate injuries and 40 had had meniscectomies. Of the 47 players with knee injuries 9 (19%) had gonarthrosis and of the 239 without known knee injuries 11 (5%) had gonarthrosis. In the elite players the prevalence of gonarthrosis in uninjured knees was 11%. We conclude that soccer, especially on high level, is associated with an increased risk for gonarthrosis, even in the absence of diagnosed knee injuries.

198. Evaluation of pain and ache in orthopedic research—a critical analysis

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In a controlled double blind study performed by the authors, five different methods were used to evaluate the effect of treatment on pain and ache. The different methods did not give uniform results and it was obvious that the effect of treatment could be interpreted in several ways leaving room for a biased observer. The differences between methods used initiated us to study how pain actually is measured and presented in orthopedic literature.

Method: Two well known orthopedic periodicals published in 1989 and 1990 were chosen and 77 articles were found reporting the effect of treatment on pain and ache and the method used for the evaluation was recorded.

Result: The number of patients studied was 34 (median). The study was retrospective in 61%. It included controls in 23%, was randomized in 14% and blind in 2%. The degree of symptoms after treatment were measured as none to severe in 2-5 steps by 61% of which 50% were included in a score. The effect of treatment on symptoms was recorded as good, fair, poor in 28% of which 22% were included in a score. Visual analogue scale was used by 10%. Only 3% of the articles used more than one method for evaluation.

Conclusion: Pain and ache are the primary symptoms behind orthopedic treatment. It is a well known fact augmented by our own results that these symptoms are difficult to evaluate. The conclusion of the analysis was that the methods used for measuring and presenting pain in current orthopedic literature is not optimal. It is suggested that pain and ache must be assessed using several different methods, and that conclusions regarding effect of treatment are based on a total analysis of the different methods.

199. Occurrence of incapacity for work due to nonacute orthopedic disorders—a prospective study of patients treated surgically in a defined population

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Introduction: Waiting time for orthopedic surgery is long in many regions of our country, and also in several other countries. One consequence of this is delayed treatment for patients incapacitated for work. The aim of this report was to study the occurrence of incapacity for work prior to surgery for nonacute orthopedic disorders.

Patients and methods: All 2803 patients hospitalized for nonacute orthopedic disorders from a population of 197 354 persons in the Trondheim area in Central Norway, during the two year period 1/9 1988–31/8 1990, were included in the study. Data on employment, diagnosis, treatment, sickness certification and sickness benefits from National Insurance were registered.

Results: Of the 1400 employed persons (50%), 1333 were treated surgically. Their mean age was 40.7 (16–73) years. Mean waiting time from registration on the waiting list until admittance in hospital was 525 (1–2012) days. Of the 1333 employed patients treated surgically 562 (42%) had been certified sick due to the orthopedic disorder for some period of the waiting time. Sickness benefits from the National Insurance (paid from the 15th day of sickness certification) had been received by a total of 437 patients (33%) and were received most frequently among employed persons treated with spinal surgery (71%), total hip prosthesis (61%) and shoulder surgery (47%). A total of 319 patients (24%) received sickness benefits at the time they were put on the waiting list; at treatment this number had increased to 388 (29%). In total the 437 patients incapacitated for work for some period of the waiting time received sickness benefits from the National Insurance for 91 687 calendar days while waiting for surgery. A maximum limit for waiting time for surgery of 30, 90 or 180 days would have reduced this number to 9131, 22595 or 36314 days, respectively.

Conclusions: We conclude that about one half of the patients treated surgically for nonacute orthopedic disorders are employed, and that about one quarter of employed persons will be incapacitated for work at the time the indication for surgery is determined. Furthermore, a long waiting time results in a slight increase of the proportion of patients incapacitated for work. There is a great potential for reduction of the costs to preoperative sickness benefits by limiting waiting time for surgery.

200. Return to work after orthopedic surgery—a prospective study of patients incapacitated for work due to nonacute orthopedic disorders

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Introduction: A considerable amount of patients treated for orthopedic disorders are incapacitated for work due to the disease at the time of surgery. The aim of this study was to investigate to what extent employed persons incapacitated for work due to nonacute orthopedic disorders were able to return to work during the first year after surgical treatment.

Patients and methods: All 2803 patients hospitalized for nonacute orthopedic disorders from a population of 197 354 persons in the Trondheim area in Central Norway, during the two year period 1/9 1988–31/8 1990, were evaluated. 380 patients meeting the following criteria were included in this study: Employed, between 18–65 years of age, treated surgically, certified sick due to the orthopedic disorder at the time of surgery and receiving sickness benefits from the National Insurance (paid from the 15th day of sickness certification to all employed persons). Data on employment, diagnosis, treatment, waiting time, sickness certification and sickness benefits from National Insurance were registered.

Results: Mean waiting time for surgery was 323 days, 57% were men, mean age was 42.5 years. 33% of the patients had been on sick leave for more than 12 months preoperatively. Of the 380 patients 23% returned to work before 3 months, 40% before 6 months, 50% before 9 months and 53% before 12 months after surgery. A year after treatment 14% were permanently incapacitated and received a disability pension and 32% were still receiving sickness benefits. The highest percentages returning to work were found among patients suffering from disorders treated with arthroscopic knee surgery (67%), ligament reconstruction/arthrotomy of the knee (73%) and hand surgery (61%), the lowest percentage among patients treated with spinal surgery (32%) and total hip prosthesis (30%). In a multivariate logistic regression model age above 45 years was associated with an odds ratio of 2.6 and preoperative sick leave for more than 12 months with an odds ratio of 10.3 for not returning to work during the first year after surgery.

Conclusions: More than 50% of patients incapacitated for work due to nonacute orthopedic disorders at the time of surgery can return to work during the first year after treatment. A long preoperative sick leave seems to increase the risk of not returning to work after surgery considerably.

201. Audit of severely injured patients in North West Britain

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The care of the injured in Great Britain has been regarded as unsatisfactory by several authors. To enable constructive improvements in trauma care a broad study of patient characteristics and workload is required.

A 1-year prospective audit of 1088 victims of severe trauma presenting to 4 Teaching and 12 District General Hospitals, serving a population of 3.2 million, in Mersey Region, North Wales and the Isle of Man was carried out. Severe trauma was defined as, Injury Severity Score (ISS) greater than 15 or Death due to Trauma (excluding elderly fracture neck of femur).

430 patients died prior to arrival at hospital, 658 patients arrived alive and 309 (47%) of these subsequently died.

Mechanisms of injury were, blunt 76%, penetrating 3.6%, burns 5.8%, drowning 4.6%, hanging 7.5%, asphyxia 1.4 and electrocution 0.7%. The incidence of penetrating injury was markedly lower than in the U.S.A.

8.2% of blunt trauma casualties were children and 24% were aged greater than 65 years, with a general male preponderance of 2.6 to 1.

Road accidents were the cause of injury in 66%, and falls in 24%.

Pedestrian injuries were more common in children and the elderly. Vehicle drivers and motor cyclists were predominantly young adult males.

17% were injured at home, usually due to falls. This group was mainly female and older. 5% were injured in work accidents, mainly by falls from height or crushed by weights or machinery.

Blunt trauma patients who died were older (40.6 Yrs. BID, 52.4 Yrs. Died in Hospital, 34.4 Yrs. Lived), more severely injured (ISS, 66 BID, 36 D, 25 L), and in a worse pathophysiological condition on arrival at Hospital (RTS 4.8 D, 6.6 L, APACHE II 22.8 D, 11.8 L) (All differences between groups were statistically significant, $p < 0.05$).

The population incidence of blunt trauma was 26/100,000, and for those arriving alive at hospital 19/100,000. These patients accounted for only 0.08% of Accident Department workload, with 3.1 new patients per hospital per month. (Range 1–5 patients).

Hospital mortality for blunt trauma was 45% and analysis using TRISS methodology indicated that 47% of deaths and 6% of survivors were unexpected.

Peer review suggested that 16% of in-hospital deaths (28 male, 16 female) (13% of Head Injury deaths, 22% of nonHead Injury deaths) may have been preventable.

202. Measurement, management and prediction of waiting times for orthopedic surgery

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Waiting time for treatment is an important parameter in the evaluation of health services. An adequate model for calculations and surveillance of waiting lists and waiting times is of importance in the administration of orthopedic surgery.

We discuss different measures of waiting time, as well as the factors that influence waiting time, the number of patients accumulated on the waiting list, the inflow of patients to the list, the number of patients removed from the list without treatment and the number of patients removed from the list as treated. A method for continuous registration and surveillance of these factors and the waiting time for treated and waiting patients in use at our department is presented. We also present a mathematical model to describe the relation between these factors.

$$WT' = \frac{(N + t \times T) (1 - S) - t \times K}{K}$$

WT'	Predicted waiting time for patient put on waiting list at time t'
N	Number of patients on waiting list at time (t0) of calculation
t	Number of units of time (months) until t' (from t0)
T	Number of patients registered on list per unit of time (month)
S	Proportion of patients removed from the list without treatment
K	Treatment capacity per unit of time (month) for this category of patients

This model has proved to be a useful tool in predicting waiting time, and in estimating and documenting the treatment capacity required to reach defined goals for waiting time.

203. Prevalence of Dupuytren's contracture and its correlation with degenerative changes in hands and feet and with criteria of general health

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The prevalence of Dupuytren's contracture and its coincidence with degenerative changes in the hands and feet as well as loss of distal pulses, were studied in 574, 55-year-old

residents of Malmö, Sweden. Dupuytren's contracture occurred in 6%—predominantly in men. Dupuytren's contracture was more common in men with degenerative joint changes in their feet and in men with signs of impaired arterial blood flow in the lower limbs.

Men with Dupuytren's contracture had significantly less subcutaneous fat tissue, as measured by a triceps skinfold index, than men without Dupuytren's contracture. Other signs of general health, occupational work load or psychosocial factors did not interact with Dupuytren's contracture in the current study.

204. Fracture incidence after ankle fractures

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Introduction: We have earlier found that even 30 years after tibia shaft fracture there is less bone mass in the femur condyle in the injured side compared with the uninjured. If this is of any clinical significance, causing an increased incidence of new fractures in the once fractured extremity, is not known. In order to solve this question a retrospective cohort study was performed.

Method: All ankle fractures in Malmö between 1950–1951 and 1961–1965 were on record. After excluding patients with earlier fractures or multifractures at the time of the ankle fracture, 1,063 patients remained. In Malmö all radiographs and reports are saved since the beginning of the century, with the possibility of recording also all subsequent fractures that these patients had sustained. 260 patients were still living in the city of Malmö at the time of the investigation in 1992. Fracture data of these patients were compared with double age- and sex-matched controls randomly chosen from the city files of Malmö.

Results: The group with former ankle fractures had an increased incidence of all sorts of fractures, both in the upper and lower extremities compared with the controls. There was, however, no difference in the risk of sustaining new fractures in the once fractured extremity, compared with the uninjured side.

We conclude that remaining posttraumatic osteopenia after ankle fracture is of minor clinical interest with regard to the future fracture risk. The reason for the increase in the fracture incidence in ankle fracture patients compared with controls is not clear. However, ankle fractures have the epidemiological age and sex patterns of a fragility fracture.

205. A review of pediatric trauma in North West Britain

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The purpose of this study was to review the management and outcome of 102 severely injured children (Injury Severity Scores (ISS) >15 or death) identified during a one year prospective audit of all severe trauma in an NHS Region with a population of 3.2 million. Their mean age was 8.2 (0.3–15) years and 62% were male. The causes were blunt injury in 75 (73.5%) burns in 11, drowning in 11, hanging in 3, electrocution in 1, and asphyxia in 1. There was no case of penetrating trauma.

Pediatric trauma (all causes) made up only 0.007% of Accident Department workload, with each District General Hospital (DGH) receiving only 3.9 children per year (cf. overall severe trauma 3.1 patients/hospital/month).

Comparison between DGH's and Children's Hospital (CH) showed no differences in age, sex, injury mechanism or ISS. Management errors were made in DGH's and CH. I.V. access was by single cannula in 75% patients, airway care by intubation in 45% and cervical collars were used in only 30%. Significant injury was missed in 24%, 10% were under transfused, airway care was deficient in 28% and surgery was delayed in 20%. Statistical significance was reached only for airway care and pre-operative delay where the CH was better.

The blunt injuries were analyzed in detail. 52 (70%) were injured on the roads, 38 as pedestrians.

	N	Distribution of injuries (%)		
		Head	Chest	Abdomen
Pre-hospital deaths	15	100	67	13
Admissions	60	85	16	22
In-hospital deaths	23	91	59	35

20 patients with head injury were transferred to the regional Neuro-Surgical Centre. Median ISS were significantly different between survivors and fatalities (25 and 45) but not different between pre- and in-hospital deaths. TRISS analysis indicated 6 unexpected deaths. In 4, significant injury was missed and airway care was deficient.

Conclusions: There is a need to: 1) promote accident prevention; and 2) improve pediatric trauma management at both tertiary care level and at District General Hospitals by developing trauma management protocols.

The low numbers of severely injured children presenting to DGH's suggests a need for a regional trauma system with centralisation of care.

206. Amputation in Malmö, Sweden, during 1979, 1984, 1989, and 1990—a study of the incidence and the profile of the patients

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In a retrospective study of all first major amputations in Malmö during 1979, 1984, 1989, and 1990, we studied the incidence and any changes of the background factors of the patients—160 men and 179 women.

Results: The incidences of major amputations during the four years were 42, 39, 35 and 32 per 100,000 residents. In patients >80 the incidence decreased significantly from 48 per 10,000 in 1979 to 30 per 10,000 in 1990.

Adding the four years we found—in men and women—a mean age of 73 and 80 years, respectively. 78 and 69% had a BKA; 36 and 34% had a previous vascular operation in the same limb; 68 and 55% were living in their own homes—47 and 84% of these were living alone. The length of stay in hospital was on an average 33 and 47 days and 19% of the men and 16% of the women were re-amputated. The mortality within one month was 21 and 20% and within one year 43 and 39%. 39 and 28% received a prosthesis.

Of associated conditions we noted diabetes mellitus in 39 and 34%, RA in 4 and 10%, heart disease in 49 and 57% and a history of a previous hip fracture in 11 and 23% for men and women respectively. There was a significant increase in the percentage of AKA from 1979 to 1990, otherwise only minor changes were observed.

Conclusions: The incidence of major amputations has decreased during the 1980's. We cannot explain this change from the background factors. Maybe a better lifestyle and a changing attitude to major amputations of patients as well as surgeons are the most important factors.

207. Epidemiology of injuries of the shoulder in Malmö

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Major injuries of the shoulder include fractures of the proximal end of the humerus, the clavicle and the scapula and dislocations of the glenohumeral and acromioclavicular joints. The aim of this study was to describe the epidemiology of shoulder injuries in an urban population.

In 1987 3,783 fractures were treated at the Department of Orthopedics, Malmö General Hospital. There were 462 fractures of the shoulder: 298 fractures of the proximal end of the humerus, 147 fractures of the clavicle and 17 of the scapula. Besides 54 patients had sustained a primary

dislocation of the shoulder and another 19 an acromioclavicular dislocation.

There was a significant sex and age difference between patients with fractures of the proximal humerus and fractures of the clavicle. 70 men and 228 women, median age 73 years, had sustained a fracture of the proximal humerus while 94 men and 53 women, median age 17 years, had a clavicular fracture. In both fracture groups a fall on plain ground was the most frequent trauma cause but 20% of the clavicular fractures were sustained during sport activities in comparison to 7% of the fractures of proximal humerus. There were 12 men and 5 women, median age 55 years, with a fracture of the scapula. 41% of these were injured in a traffic accident. There was also a difference in age and sex between glenohumeral and acromioclavicular dislocations. 28 men, median age 39 years, and 26 women, median age 68 years, had sustained a glenohumeral dislocation while 17 men and 2 women, median age 33 years had an acromioclavicular dislocation. 16% of the patients with glenohumeral dislocation and 32% of those with acromioclavicular dislocation were injured during sport activities.

Our data suggest that the epidemiology of the different shoulder injuries is variable. Fractures of the proximal end of the humerus are old peoples' problem, most often caused by low energetic falls. The other shoulder injuries are more frequent in younger people, often caused by a higher trauma force.

208. Congenital malformations in Greece—a population based study

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In order to establish the birth prevalence of major congenital malformations in Greece, we analysed data on a total of 11048 births which occurred nationwide during April 1983. The population sample consisted of all babies—livebirths and stillbirths—with birthweight of 500g or more. A precoded questionnaire was used for data collection and approximately 98% of all births throughout the country during the survey month were recorded. The statistical packages SPSSX and BMDP were used to carry out the analysis.

The birth prevalence of all kinds of major congenital malformation was found to be 13.7 per 1000. Only 46.7% of the malformed babies survived to the age of 1 year, but among the newborns with skeletal abnormalities only one died (a case of osteogenesis imperfecta). Fetuses with congenital defects were significantly more likely than the rest of the population to present abnormally, to be growth retarded and to be delivered preterm. Significant factors associated with the birth of a malformed baby were the maternal ages at marriage, at first pregnancy and at delivery,

the age difference between parents, parental education, father's occupation, marital status, the number of antenatal visits during the first and second trimesters, hospitalisation of the mother, highest systolic blood pressure and drugs taken during pregnancy. Logistic regression analysis showed only three of all the above factors as independently associated with the birth of a malformed baby: drugs taken during pregnancy (iron and vitamins—positive effect), mother's age at first pregnancy (the older the mother, the greater the risk) and father's education.

In conclusion, it seems that the routine prescription of iron and vitamin supplements during pregnancy has a favourable effect, while advanced maternal age at first pregnancy has an adverse one on the normal formation of the baby.

Tumors

209. Deep seated hemangioma, results of surgical treatment

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Deep seated hemangiomas of the extremities and their girdles may pose considerable diagnostic and therapeutic problems. Frequently these tumors grow extensively involving different structures such as the subcutis, inter- and intra-muscular spaces, and sometimes engage the principal nerves and blood vessels, making curative surgery difficult. Recurrences are frequent when total surgical removal of the lesion has not been accomplished primarily.

Patients treated for deep seated hemangiomas in the greater Gothenburg area during 1960–1989—a total of 94 patients, 43 males and 51 females—were evaluated. The median age of the patients was 41 years—with an age span of 13–80 years. The preoperative diagnosis was based on history, physical examination and radiographic findings. The surgical treatment consisted of local resections. 30% of the lesions were in the upper part of the body and 70% in the lower part. Histologically some 80% of the patients had a hemangioma of large vessel (cavernous) type, 10% of small vessel (capillary) type and 10% of mixed type.

The patients were examined with plain roentgen, most also with angiography and/or computed tomography. Magnetic resonance imaging was performed in a small number of patients. This method proved superior to any of the previously used radiographic diagnostic procedures, in providing detailed information about the extent of tissue spread of the hemangiomas.