either by a sudden increase in the burden (owing to the development of a complication such as incontinence or mental confusion) or to the family's sudden inability to bear the burden—for example, because of illness or death of a relative.

1. *Progressive Deterioration in Condition (59 Cases).*—Eighteen patients were admitted to hospital because their illnesses had become terminal. Those (7) living alone had naturally remained ambulant as long as possible. Their admission to hospital became imperative once they had taken to bed. Another 10 patients living alone had reached a stage of their illness in which they were unable to continue an independent existence. They were strongly attached to and determined to live in their homes, so they rarely wanted to go into hospital. Thirty-one patients were admitted because the relatives were unable to look after them any longer (for reasons other than illness of the relative). General practitioners had usually referred the patient to hospital because they were cognizant of the severe strain of looking after an old patient—a burden which, apart from its duration, brought with it loss of freedom or of employment, domestic difficulties, and quarrels.

2. *Development of an Acute Incident in a Chronic Illness (22 Cases).*—An acute episode in a chronic illness, or a new acute illness, in 22 chronically ill patients led to their admission to hospital. Examples were such conditions as a urinary infection with incontinence, and severe hemiplegia in patients already suffering from the effects of cerebral vascular disease or of mental confusion.

3. *Illness of the Relative (9 Cases).*—Nine patients were admitted because of illness of the relative on whom they were dependent. Usually the illness did not last long, so that it was possible to discharge the patient home when the relative had recovered.

4. *Squalor and Neglect (14 Cases).*—Fourteen patients, all living alone, were admitted to hospital because as a result of illness they were quite incapable of looking after themselves, and were getting so little help from others that they were in a state of neglect. The medical officer of health or the sanitary inspector had referred 12 out of the 14. In most cases persons living in the same tenement had requested the removal of the patient on the grounds that his presence was insanitary and a nuisance to the rest of the household. In all cases the living conditions were extremely squalid; the rooms were filthy, the furniture was dilapidated and verminous, and the smell was almost unbearable.

The neglect in which these people were was sometimes attributable to their physical state—for example, locomotor disorders confined them to the house. But it was also often due to the patient's mental condition or temperament. Some were mentally confused and disorientated; a few suffered from paranoid delusions and accused neighbours of thieving and other malpractices. More, however, were ultra-independent, so that they resented alleged interference from the neighbours, who, because of this, had given little aid until the patient's plight had become really desperate.

The patients themselves would not ask for medical aid, and indeed when it arrived they did not want to go to hospital. In some cases much persuasion was required on the part of physicians, social workers, the sanitary inspector, and neighbours. In no instance, however, was it necessary to apply to the magistrate's court for authority for compulsory removal.

Admission to hospital of cases of severe neglect rarely results in successful rehabilitation. Five of the patients died soon after admission, two were transferred to mental hospitals, and six as a result of treatment were fit for discharge to a hostel or to the care of friends. In no case was it possible for the patient to return to an independent existence at home, even though his home had been cleaned up.

Patients Not Admitted to Hospital

For 20% of the patients visited continued home care was recommended. Some required only supervision from their

general practitioner. Others needed out-patient investigation and treatment, home-helps, district nurses, or "meals on wheels." Four patients were admitted to a hostel instead of to hospital. Brooke (1948) has discussed the services that can be provided in the home, and the place of the out-patient department in the care of the aged sick.

Conclusion

The present domiciliary survey in the Borough of St. Pancras shows that only about one-fifth of the patients referred to hospital for admission were suitable for continued care at home. Yet the aim must be to treat as many patients as possible in their homes, and they should be provided with the greater part of the services they would have received had they been in hospital.

Should hospital treatment be required it must, whenever possible, be a temporary event in the life of an old person. The importance of selecting patients for admission has been stressed by Amulree *et al.* (1951). Home is the proper place for the aged: it is there that their roots are deeply implanted; and in the home are to be found their interests and their place in the family. All these valuable assets vanish if an old person is uprooted and enters hospital, where, after a prolonged stay, a decline in his faculties may take place.

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SURGERY IN OLD AGE

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The purpose of this paper is to summarize the results of a consecutive series of 537 operations performed by us for a variety of surgical diseases in persons over 70 years old. With the certainty of a progressively ageing population, we are presenting this series as an indication of the general results which can be achieved.

There has been only one large recent series of cases published (Carp, 1950), and these dealt with patients over the age of 60. We think that persons of 60 are too young to be considered in the surgery of old age, and that to include them gives unduly optimistic and misleading results. Another series (Ziffren, Zager, and Cullen, 1950) of 227 operations were described in patients over the age of 80. The only recent paper in the British literature (Childs and Mason, 1949) dealing with patients over 70 described only 99 cases—too few, in our estimation, to be of real value.

We are aware that the results described below leave much to be desired, but, as almost all of the cases dealt with had some crippling or lethal disease, the results should be reviewed in the light of those who have been saved rather than those who have died. The series was taken in an ex-municipal hospital which received more than its share of derelict cases, and because of this we are grateful to have had considerable opportunity of practising surgical salvage, often on what is generally believed to be an "inoperable" case. With this in mind we feel that the results are better than is generally supposed, and surgery is frequently rewarding, even in the very poor risk case. The cases were operated on in the years 1945-9 inclusive; one of us was away for nearly two years during this period. We did a total of 4,721 operations in the same period, and about one in nine were on patients over the age of 70. The series does not include six cases with inadequate data.

Analysis of Results

Among the 537 cases were 103 minor operations (cystoscopy, simple biopsy, etc.). Only one patient died after a minor procedure (passage of bougies and insertion of catheter), and this was carried out on a medical patient who was in cardiac failure and had retention of urine. These minor procedures are not discussed further, as they do not constitute a surgical problem.

The remaining 434 cases (339 males, 95 females) which form the subject of this paper all had major surgical operations, 252 as elective and 182 as emergency procedures. The great preponderance of males in the series was due to the large number of prostatic cases. The cases were divided into four groups for analysis: operations for prostatic obstruction, operations for intestinal obstruction, amputations, and other operations. The group of "other operations" included a large variety of major surgical operations (mastectomy, nephrectomy, cholecystectomy, repair of perforated peptic ulcer, gastrectomy, appendicectomy, etc.) and a few lesser procedures such as repair of simple hernia and removal of haemorrhoids. The largest number in any one group occurred in those treated for prostatic obstruction; these accounted for about a quarter of the total cases. The patients' ages varied from 70 to 91. The largest number of operations, 223, occurred in the 70-74 age group (Table I).

TABLE I.—Age Groups

Age Groups	Total No.	Deaths
70-74	223	48 (21.5%)
75-79	145	46 (31.7%)
80 and over	66	24 (36.4%)

The anaesthetics used were spinal, inhalational (varying from open ether to the modern mixtures given in a closed circuit and supplemented with thiopentone and curare), and local. An analysis of the types of anaesthetics given, with the total mortality in each group, is recorded in Table II.

TABLE II.—Anaesthetics Used

	Prostatic Obstruction	Intestinal Obstruction	Amputations	Other Operations	Total	Deaths
Spinal	177	51	11	57	296	76 (25.7%)
Inhalational	4	21	6	68	99	32 (32.3%)
Local	7	14	—	18	39	10 (25.6%)

Table III shows the length of stay in hospital of the patients who survived. It will be noticed that a considerable number (45.8%) stayed longer than 28 days. Many of these patients, however, were kept because of non-medical causes,

such as waiting for surgical appliances (colostomy belts, etc.) and awaiting transfer to institutions for the aged. No attempt has been made to make allowance for these factors.

TABLE III.—Length of Stay in Hospital of Surviving Patients

Length of Stay	No. of Patients in Various Groups				
	Prostatic Obstruction	Intestinal Obstruction	Amputations	Other Operations	Total
1-14 days	16	5	—	18	39
15-21	31	14	—	24	69
22-28	28	15	—	20	63
29 days and over	72	20	7	46	145

The mortality figures are recorded in Tables IV and V. All patients who died before discharge from hospital, however long after the operation, are included in the deaths. Of the 434 patients operated on 316 recovered and 118 died (27.2% mortality). Recent papers dealing with patients over the age of 70 give mortality rates of 21.7% (Ziffren,

TABLE IV.—Mortality According to Groups

	Prostatic Obstruction	Intestinal Obstruction	Amputations	Other Operations	Total
No. of cases	188	86	17	143	434
No. of deaths	41	32	10	35	118
Mortality rate	21.8%	37.2%	58.8%	24.5%	27.2%

TABLE V.—Mortality: Emergency and Elective Operations

	Emergency Operations	Elective Operations	Total
No. of cases	182	252	434
No. of deaths	61	57	118
Mortality rate	33.5%	22.6%	27.2%

Zager, and Cullen, 1950) and 17% (Childs and Mason, 1949). The latter series consisted of cases in a teaching hospital, and it is likely that the clinical material was better than in the present series. In another paper describing a series of patients over the age of 60 (Cutler, 1950) the mortality rate was 52%.

Discussion

Prostatic Obstruction

Many of these cases were admitted in very poor condition, often in uraemia and almost always with vascular degenerative disease, and a high proportion (88.8%) had acute retention. In spite of these adverse factors the results of operations for prostatic obstruction were not unencouraging.

The Wilson Hey method of prostatectomy, usually done as an immediate operation, was the procedure of choice. It was not considered to be the best method, however, in patients with severe urinary infection and approaching uraemia, and in patients whose general condition was very poor from any cause. We believe that the Wilson Hey prostatectomy is more formidable than the Freyer, and not every patient will survive it. The Freyer type of prostatectomy in one or two stages was used for most cases that were unsuitable for the Wilson Hey procedure; in the remainder some other form of prostatectomy was used. The numbers of the various types of operation performed for prostatic obstruction are shown in Table VI.

TABLE VI.—Number of the Various Types of Operation for Prostatic Obstruction

Wilson Hey	Freyer 1 and 2 Stages	Retropubic	Suprapubic, Diathermy Resection	Permanent Suprapubic	Total
66	94	2	13	13	188

Intestinal Obstruction

The causes of intestinal obstruction were many and varied, and included strangulated internal and external herniae, carcinoma of the colon, gall-stones in the terminal ileum, volvulus, adhesions, and intussusception.

The results of strangulated external hernia were the best of this group (47 cases with 9 deaths), partly owing to the ease of diagnosis in this type of obstruction. Many of these old people, however, did not seek medical aid until the third or fourth day of their illness, and in these the likelihood of gangrene of the bowel was greatly increased, with its attendant very high mortality. It is our policy to invaginate the gangrenous area of the bowel whenever possible. This avoided a resection in several cases, and we did not meet with the complication of a new obstruction occurring at the site of invagination. We have found that surprisingly large areas of gangrenous bowel can be invaginated with impunity.

The results of large-bowel obstruction due to a carcinoma are more gloomy. Again there was often a long delay before the patients sought medical aid; many of them had long-standing constipation, and the supervention of acute obstruction often passed unheeded for a week or so. The results of emergency operations to relieve these large-bowel obstructions were 17 deaths in 27 cases. Of those who survived, two had further procedures to remove the obstructing cause, and all these recovered from the multiple-stage operations.

It is our policy to perform a laparotomy on cases of large-bowel obstruction to determine the exact cause and site of the obstruction and then to relieve it by the simplest surgical means—a colostomy for choice; but occasionally a caecostomy was the only means possible. We believe that it is better to avoid a blind operation for bowel drainage in these patients; in only five cases was a blind procedure done, and all were fatal.

We also believe that entero-anastomosis in acute large-bowel obstruction is not justifiable, and that suture of the dilated and friable bowel almost always leads to peritonitis and death.

The use of gastric suction and fluid and electrolyte-balance measures was necessary as in any case of intestinal obstruction. Intravenous fluid, however, was withheld unless fluid and electrolyte balance could not be restored or maintained by any other means, as we have found that intravenous therapy is not without danger in the aged, mainly because of its tendency to produce pulmonary oedema and to precipitate pneumonia.

Amputations

The results of the amputations are depressing. Minor amputations may be performed as indicated in younger patients, though, as might be expected, healing is much slower. Occasionally amputations below the knee are justifiable, as the mortality is considerably less than in amputations performed at a higher level. However, a vascular lesion in these patients, causing gangrene of even the toes, inevitably requires amputation at a high level to secure enough vascularity and healing of the wound. It is worth adding that in the last two years no tourniquet has been used for these operations.

In this series the mortality was 58.8%. This is not entirely attributable to the operation. It shows that a peripheral vascular catastrophe at this age is often the herald of impending death.

Other Operations

This group includes all other types of operations performed. No attempt has been made to analyse the results of the various operations in this group, as the numbers concerned are too small to be of any significance. Interesting operations in this group included five cases of repair of perforated peptic ulcer (three gastric and two duodenal) and two cases of appendicectomy for acute appendicitis, all of which are rather rare emergencies in old age. Other rare emergencies were one case of torsion of the omentum and one case of spontaneous rupture of the spleen at the site

of a cavernous haemangioma. The latter was treated by splenectomy, and is the forty-fifth case of its kind to be recorded (Bostick, 1945).

Diagnosis

This presents many difficulties peculiar to old age. These patients are often not accurate witnesses, and deafness is an added difficulty. The onset of many diseases is a much slower process in the aged, and many symptoms are attributed by the patient to their old age. Complete investigation is not always possible as they do not readily tolerate prolonged radiological or biochemical studies. However, we do not suggest that essential diagnostic procedures are to be omitted on account of age alone. In our experience it has often proved impossible to forecast the true extent of the pathological process before operation. In consequence some of the patients were submitted to surgery when all chance of relief was found at operation to have gone many months earlier. It is in this sort of case that patients were found at operation to have multiple carcinomatous secondary deposits and no useful surgical procedure could be undertaken; these cases are included in the mortality list.

Anaesthesia

As shown in Table II, all three main types of anaesthesia were used. We believe, however, that spinal analgesia has a worthy place in treating these old patients, who tolerate it well, and that it is the method of choice in dealing with intestinal obstruction and for prostatectomy. It was used in all but 11 of the prostate cases. We admit, however, that to use it safely and successfully experience in the technique is essential and its limitations and contraindications must be appreciated. With the continued improvement in general anaesthesia in recent years we have used spinal analgesia less often than formerly. General anaesthesia usually consisted of thiopentone and curare in conjunction with an inhalational anaesthetic in an open or closed circuit. Curare was in regular use even at the beginning of this series, and hence the number of cases submitted to simple open ether was relatively small; it was used in only 11 cases. Local analgesia was used if it was thought that the patient was too ill for any other method. It was not employed as a routine procedure for any type of case, and altogether it was used in only 39 operations—14 of which were for intestinal obstruction, mostly strangulated external herniae.

Early Ambulation

Our patients were not submitted to the whole-hearted regime of early ambulation. A patient gravely ill, or one in the throes of intravenous infusion or bladder drainage, was allowed to remain in bed. Many patients, however, have been got up on the day after operation. Thanks to the efforts of the nursing staff, bedsores were unusual and never caused us anxiety. The diet in the post-operative period may present more problems. To take hospital diets some coaxing may be required; fads are frequent in the aged, and the help of the dietitian may be necessary. Administration of vitamins, especially vitamin C, is beneficial.

Causes of Death

Post-mortem examinations were carried out in 72 of the 118 fatal cases, and in these the cause of death was known for certain. In most of the other cases an accurate assessment of the cause of death was usually possible. In the prostatic cases death was often due to pyelonephritis and uraemia (17 out of the 41 cases). Recently this has been partly controlled with antibiotics, particularly streptomycin and chloramphenicol. Chest complications also accounted for a large number of the deaths (30 of the 118). The precipitation of fatal chest conditions was due to a number of factors—exacerbation of long-standing bronchitis, myocardial insufficiency, and over-enthusiasm with intravenous fluid being the most important.

Another potent cause of death was general deterioration, in which most systems took part. In these cases the opera-

tive procedure proved too much for the patient, although it was the only possible measure. There is no certain way of forecasting the outcome of an operation on a patient on the brink of death, and we have been surprised that some have survived and returned to a normal life. The commoner degenerative diseases—renal failure, vascular degeneration, coronary heart disease, cerebral arteriosclerosis—all combined to bring about the fatal issue in these cases.

As might be expected, there were a number of purely vascular causes of death (cerebral thrombosis two cases, coronary disease four cases, iliac-vein thrombosis one case). These usually occurred suddenly and without warning in a patient whose progress had hitherto been satisfactory.

Conclusion

We believe that even major surgical procedures are often justifiable in old age. It is necessary, however, that one's surgical valour should be tempered with discretion and that the operation should be the minimum consistent with cure or symptomatic relief. A colostomy, for example, may be all that is justifiable in large-bowel obstruction, and sometimes, though less often, permanent suprapubic cystostomy is all that is justifiable in prostatic urinary obstruction. We also believe that unless cure or symptomatic relief is likely to be achieved it is better not to operate. It is unjustifiable and unkind to attempt desperate surgical ventures that would be fitting in younger patients.

A better selection of cases would improve the mortality rate, but as usual the problems of selection are insuperable. It is as important to give relief to all those who would survive the surgical ordeal as to withhold operation from those who would not stand it. With experience we have found that an accurate assessment of the result of surgery can often be made from the general clinical condition of the patient, and this is often the best guide to fitness for operation.

With continued improvement in surgical technique, the use of new antibiotics, further knowledge of the biochemistry of disease, and further improvements in anaesthesia we are looking forward to the time when only patients over 80 will be discussed in the surgery of old age.

Summary

A series of 537 operations were performed on patients over the age of 70, of whom 119 died, giving a total mortality rate of 22.2%.

Of these patients, 434 underwent major operations, and 118 of them died, giving a mortality rate of 27.2%. The causes of death are analysed and discussed.

We believe that surgery in old age is rewarding more often than is generally believed, and we think this will prove even truer in the future.

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Last year at the Conference on Military Medicine, held at Vichy under the auspices of the Office International de Documentation de Médecine Militaire, delegates discussed the problem of the rôle of medicine in biological warfare. A questionnaire was sent out, and replies have been received from more than 20 countries. A tentative answer to the problem, reported at the conference held in Brussels last month, is to separate curative medicine from experimental research work. The conference voted in favour of referring the whole question of international medical law to international authorities, particularly W.H.O., in order to clarify the position of doctors in peace and in war. Other questions discussed included the identification of medical and religious personnel in the armed Forces, and the minimum numbers of doctors, nurses, chaplains, etc., essential in prisoner-of-war camps.

PSITTACOSIS IN A FAMILY

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Psittacosis in man was for long regarded as a serious disease with a high mortality rate and as being transmitted by parrots. It has, however, become increasingly recognized that a milder form exists, and the virus has been isolated from other birds, notably pigeons (Andrewes and Mills, 1943), domestic fowl, and fulmar petrels. Frequent references to the milder form have been made by American workers: Brown (1943), quoting a series of 45 cases of atypical pneumonia, stated that the psittacosis virus had been isolated in 10. Cases of this type seem to have been rarely described in this country (Thomson, 1930, 1943). The following two cases occurred in one family.

Case 1

A general labourer aged 16 was admitted as a case of pyelitis on May 15, 1951. He gave a history of general malaise, anorexia, headache, nausea, and severe lower back pain for the previous three days and had fainted on the day of onset. When seen these symptoms were still present, and in addition he complained of pain in the eyes on attempting to read. There was no cough or recent upper respiratory infection.

On examination he was flushed, the tongue coated, and the temperature 102.6° F. (39.2° C.). There were no palpable glands and no renal tenderness. Nothing abnormal was found in the abdomen or in the respiratory, cardiovascular, and nervous systems. The urine was normal on ward testing. This clinical picture suggested the possibility of influenza or virus pneumonia.

Meanwhile, "sulphatriad," 1 g. six-hourly, had been started by the admitting officer, and this was continued until May 18, a total of 11 g. having been given. On that day the patient was still febrile and complained of frontal and occipital headache. Examination then revealed a small area of distant bronchial breathing, bronchophony, and whispering pectoriloquy about 2 in. (5 cm.) below the inferior angle of the left scapula, with some inspiratory rales. An x-ray film showed partial consolidation of the left lower zone of "ground glass" appearance. At this stage the diagnosis of virus pneumonia seemed highly probable and Q fever was considered. Chloramphenicol, four capsules (1 g.) thrice daily, was given and the temperature fell to normal within 24 hours, the patient's general condition improving simultaneously. After three days no clinical abnormalities were detected in the lungs and the drug was discontinued (total 11 g.), the temperature remaining normal. An x-ray film on May 25 showed partial clearing, and a repeat film on June 14 showed resolution to be complete.

Laboratory Investigations.—Urine (May 16): no pus, blood, or casts in centrifuged specimen. White-cell count (May 17): 8,850 (polymorphs 72%, lymphocytes 23%, monocytes 4%, eosinophils 1%). Serology (May 18): no cold agglutinins detected in the serum. Virus complement-fixation test:

	May 22	June 5
Psittacosis/lymphogranuloma venereum ..	<1 in 10	1 in 160
Influenza A and B	<1 in 16	<1 in 16
Q fever	<1 in 16	<1 in 16
Streptococcus MG	<1 in 10	<1 in 10

Skin tests (June 23): Frei antigen, positive; psittacosis antigen, negative; control, negative.