We have no reason to suspect that the procedure is condemned or even frowned upon by the Societies concerned or by the insurance companies.

Inasmuch as the National Council for Maternal and Family Welfare operates clinics at which the procedure is performed, and presumably has its own employees assisting at these clinics, we would say that it is advisable for the Council to take out public liability insurance covering the work done at the clinics.

ORAL CONTRACEPTIVES

The answers to the above questions, in relation to a doctor who prescribes oral contraceptives, are the same.

In regard to question 5, a doctor who prescribes oral contraceptives will presumably check the patient's medical history with regard to any predisposition to the complications mentioned and he will also, presumably, warn the patient that if she develops particular symptoms she should at once seek medical advice.

ADDENDUM

Since preparing the opinion set out above, Messrs. Syfret, Godlonton & Low have drawn attention to a report that a British medical team have warned that patients who use 'the loop' are likely to develop anaemia. If this can be taken as authoritative, the warning should be passed on to the patient and her husband before 'the loop' is used, as should be done in all cases where a procedure is likely to have serious effects.

THE CAPACITY FOR PHYSICAL WORK OF WHITE MINERS IN SOUTH AFRICA*

I. THE EFFECTS OF AGE ON WEIGHT AND HEIGHT OF MINERS


Miners' Medical Bureau, Johannesburg

The weight of the Caucasian male increases with age, although it is not known how general this is in different occupational groups. Maximum oxygen intake, the main factor limiting a man's capacity for endurance effort, decreases with age. The increase in weight and the decrease in maximum oxygen intake, in combination, cause a greater reduction in the capacity for endurance work than if either of these 2 changes occurs separately. This is particularly the case for work in which the body is moved against gravity, such as walking, climbing up inclines, etc.

It is not known with any precision how the body-weights of White miners in the Republic of South Africa change with age and, therefore, the extent to which this factor plays a part in the decline in their capacities for physical work as they grow older; nor is it known whether their changes in weight with age differ from those of males in other occupational groups in the Republic of South Africa, or from those of miners in other countries.

As a first step in the examination of this question, a detailed analysis was made of the weights and heights of two relatively large samples of mine workers, divided into 10-year class-intervals of age between 20 years and 70 years. One group consisted of miners who had presented themselves for 'benefit' examinations and the other, larger group comprised men taken at random as they were called up for their annual examination at the Miners' Medical Bureau. Regression equations of weight on height were calculated for each of the 10-year age-groups because the regressions indicate whether the change in weight with increasing age is uniformly spread over the range of heights, or whether the increase in weight is specific to men of a certain height.

METHODS

Heights and weights are recorded on all White miners at the time of the entrance examination, and again at the annual periodical examinations. The balance is an Avery Model No. 673/174 and it is sensitive to a change of 30 G.

By means of a permanently-installed sliding scale, heights are recorded while the men are in their stocking feet.

RESULTS

Mean Weights and Heights

The mean weights and heights, and the standard deviation about the means, were calculated and are given together with the correlation coefficients between weight and height in Table I.

<table>
<thead>
<tr>
<th>Ages (yrs.)</th>
<th>No.</th>
<th>Means (kg.)</th>
<th>SD</th>
<th>Means (cm.)</th>
<th>SD</th>
<th>t'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 20</td>
<td>200</td>
<td>69.9</td>
<td>7.91</td>
<td>175.9</td>
<td>5.98</td>
<td>0.62</td>
</tr>
<tr>
<td>20 — 29</td>
<td>583</td>
<td>72.8</td>
<td>10.05</td>
<td>176.3</td>
<td>6.16</td>
<td>0.40</td>
</tr>
<tr>
<td>30 — 39</td>
<td>518</td>
<td>77.2</td>
<td>11.18</td>
<td>175.3</td>
<td>6.68</td>
<td>0.51</td>
</tr>
<tr>
<td>40 — 49</td>
<td>444</td>
<td>78.5</td>
<td>11.89</td>
<td>174.8</td>
<td>6.71</td>
<td>0.41</td>
</tr>
<tr>
<td>50 — 59</td>
<td>427</td>
<td>79.2</td>
<td>11.92</td>
<td>173.3</td>
<td>6.55</td>
<td>0.47</td>
</tr>
<tr>
<td>60 — 69</td>
<td>180</td>
<td>75.9</td>
<td>11.59</td>
<td>171.7</td>
<td>5.99</td>
<td>0.49</td>
</tr>
</tbody>
</table>

From this analysis it can be concluded:

1. That the mean height of the samples decreases with age, from 175.9 cm. (5 ft. 9 in.) in the age-group below 20 to 171.7 cm. (5 ft. 7 in.) in the 60 - 69 age-group.

2. That weight increases from 69.9 kg. (154.1 lb.) in the group below 20 years to 79.2 kg. (174.6 lb.) in the 50 - 59 age-group (a gain of 9.3 kg. or 20.5 lb.) but the mean weight falls to 75.9 kg. (167.3 lb.) in the 60 - 69 age-group.

3. That the standard deviation of height does not change with increasing age, whereas the standard deviation of weight does do so, indicating that the scatter of weights about this mean increases with increasing age.

*Date received: 3 July 1967.
†Director, Human Sciences Laboratory, Chamber of Mines, Johannesburg.
‡Head, Clinical Sciences Division, CSIR Pneumoconiosis Research Unit, Johannesburg.
4. That the correlation coefficient between weight and height is highest in the below-20 age-group, indicating a closer correspondence between weight and height in the late adolescent than in the other age-groups.

**Distribution in Weight at Different Ages**

In Fig. 1 histograms are given of the percentage of the sample in different class-intervals of body-weights for the various class-intervals of age, i.e. these are histograms of the distribution in body-weight in the different age-groups. It will be noted that there is a slight tendency to skewness to the right in the histogram of the under-20 age-group, with one individual in the extreme weight category of 95-99 kg. In the 20 - 29 age-group the skewness to the right increases with 2 men of the extreme weight of 105 - 109 kg. and one above 110 kg. In the 30 - 39 age-group, and in the 40 - 49 age-group, the distribution of weights is more symmetrical with an increasing proportion in the higher weight categories. From these histograms one can conclude that not only is the scatter about the mean increased with rising age (as indicated by the greater standard deviations), but the proportion of heavy men (as indicated by the skewness to the right of the histogram) also increases.

**Regression of Weight on Height for Different Age-Groups**

A more useful and complete way of comparing these two physical characteristics of the miners of different age-groups is to calculate regression equations for weight on height and compare the regression lines so determined. The plots of weight on height for each of the age-groups, together with the regression lines, are given in Figs. 2 - 7 and the regression lines are compared in Fig. 8.

In Fig. 8 it can be seen that there is a steady shift upwards in the regression lines with increasing age, up to the age-group 50 - 59 years. The line for the 60 - 69 age-group, however, lies just below that of the 50 - 59 age-group.

The general conclusion that can be drawn is that between the second and the fifth decades of life the increase...
Examination of the 2 tables shows:

I. That the mean weights of the 'benefit' examinees in the age-group 40 - 49, 50 - 59 and 60 - 69 are between 2 and 3 kg. greater than those of the other miners. These differences are significant at >0.1 level (see Table VI).

Comparison with 'Benefit' Examination Miners

A total of 931 miners between the ages of 20 and 70 years presented themselves for 'benefit' examinations, i.e. they had applied on their own initiative to be examined (with a view to compensation), to determine if they had pneumoconiosis and, if so, in what degree. The mean heights and weights and the standard deviations about the means, together with the correlation coefficients between weights and heights, were calculated and are given in Table II for comparison with Table I.

| Ages (yrs.) | No. | Means | SD  | Means | SD  | 'r'
|-------------|-----|-------|-----|-------|-----|-----
| 20 - 29     | 16  | 73.0  | 9.89| 176.9 | 5.89| -   |
| 30 - 39     | 89  | 77.7  | 11.08| 174.8 | 5.83| .42 |
| 40 - 49     | 334 | 80.5  | 11.95| 174.4 | 5.79| .44 |
| 50 - 59     | 414 | 81.5  | 12.14| 173.9 | 5.73| .54 |
| 60 - 69     | 78  | 78.9  | 8.85 | 173.8 | 5.00| .43 |

Examination of the 2 tables shows:

1. That the mean weights of the 'benefit' examinees in the age-group 40 - 49, 50 - 59 and 60 - 69 are between 2 and 3 kg. greater than those of the other miners. These differences are significant at >0.1% level (see Table VI).
2. That the mean heights of the 2 groups are closely similar except in the 60 - 69 age-group, where the 'benefit' examinees are about 2 cm. taller.

3. That the 2 groups are also similar in regard to the effects of age upon the standard deviations of height and weight and in regard to the correlation coefficients between weight and height.

In Fig. 9 are given histograms of the percentage of the samples in the various class-intervals of age, in different class-intervals of body-weight. Comparison between Figs. 9 and 1 shows that there is a greater percentage of the 'benefit' examinees in the higher class-intervals of body-weight than ordinary miners.

In Figs. 10 and 11 are given the regression lines for weight on height for the 'benefit' examinees and the other miners for the age-groups 40 - 49 and 50 - 59 respectively. These graphs show that it is in the taller miners that the 'benefit' examinees are heavier than the ordinary miners.

**DISCUSSION**

**Changes in Height with Age**

It is clear from these results that there is a progressive decrease in height with age and that the heights of the miners in the 60 - 69 age-group are 4 cm. less than those of

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*Fig. 8. Regressions of weights on heights for different age-groups.*

*Fig. 9. Weight frequencies in age-groups—benefit examinees.*

*Fig. 10. Regressions of weights on heights for miners and benefit examinees for age-group 40 - 49 years.*

*Fig. 11. Regressions of weights on heights for miners and benefit examinees for age-group 50 - 59 years.*
younger groups. There are three possible explanations for this observation: the men who are now in their 60s were 4 cm. shorter when they were in their 20s than the present 20-year-olds; or the men have 'shrunk' by 4 cm. as they aged; or the taller, and therefore heavier, men have selectively decreased in numbers. This selective decrease could be due to a higher mortality in that specific group or to some (as yet unspecified) factor causing a withdrawal of those men.

Ward gave the physical characteristics of coalminers from the Midlands of England in the period 1952-1960 and found a difference in stature between the men in their 20s and those in their late 40s (the latter being 2.5 cm. less) which is of the same order as the differences in the South African miners. Although there are many differences, e.g. nutritional, genetic, etc., between the British coalminers and the South African goldminers, it seems to us that the stature changes with age in both groups have a common explanation in the better state of nutrition in the 1950s and 1960s of the young men as they were growing up.

Changes in Weight with Age

These results show that the mean weight of the samples in different decades of life increases with increasing age, and that the proportion of the samples in the overweight category increases between the second and the fourth decades. From these findings it can be concluded that the White miner in South Africa has a tendency towards obesity. Obesity is increasingly being recognized as a condition which predisposes the individual to a greater risk of cardiovascular degenerative diseases, such as coronary artery disease, and to certain metabolic disorders, such as diabetes, according to Marks.  

The explanation for the significant decrease in mean weight of the men in the sixth decade, and the decrease in proportion of the samples in the overweight category, may lie in the selectively higher mortality of overweight men compared with lighter men. Support for this contention is contained in recent studies in which it has been shown that obese males have a higher mortality than thin males with advancing age, especially if the obesity is associated with hypertension and/or high levels of cholesterol in blood, according to Chapman and Massey. However, there may be other reasons for the withdrawal of the overweight men in the sample in the sixth decade, which this study has not disclosed.

Comparison Between Miners and Benefit Examinees

The main difference between miners whose heights and weights were obtained at the periodical examinations and the miners who had presented themselves for benefit examinations (which included a battery of lung-function tests and a test of physical work capacity), was the greater weight of the benefit examinee in the age-groups 40-49, 50-59 and 60-69. This is seen both in the higher mean weights of the benefit examinees, and in the steeper slopes of their regression lines.

Why the benefit examinees should be greater in weight is not altogether clear, but the following explanation is offered. It has been repeatedly shown that oxygen consumption and weight are closely correlated, the heavier man having a greater oxygen consumption. Therefore, in tasks in which the man moves his weight against gravity, such as walking on the level, climbing up a slope, etc., the heavier man will have a greater oxygen consumption than a lighter man. Wyndham et al. have shown that in fit, young men the maximum oxygen intake, the physiological factor which determines the man's capacity for endurance work, is significantly correlated with body-weight, the heavier man having a higher maximum oxygen intake. Maximum oxygen intake falls off with age, especially in the 40s and 50s, and it may also be affected adversely by chronic bronchitis, although this subject has not been studied, as far as we are aware. Hence it is conceivable that the burden of extra weight, with the associated increase in oxygen consumption during physical effort, in a man in his 40s with chronic bronchitis, might cause the man to become breathless in climbing up a slope, or to become unduly fatigued, and therefore decide him to present himself for the benefit examination.

These points can be illustrated by taking the maximum oxygen intakes given by Lange Andersen* for males in industry in Norway, for various age-groups between 20 and 60, and calculating the maximum oxygen intakes/kg. of body-weight from the body-weights given in this paper of the miners and the benefit examinees. The results are shown in Table III. It should be borne in mind that for a moderate rate of work a man requires a maximum oxygen intake of at least 30 ml./min./kg., and for hard work, 40 ml./min./kg. It is clear from this table that the greater weight of the benefit examinees brings them nearer to the limit for a moderate rate of work at which they would be expected to manifest signs of fatigue.

Comparison with other Populations

Comparison with other occupational groups in South Africa. In order to see whether the increase in weight with increasing age is peculiar to the White in the occupation of mining, a comparison has been made with the weights and heights of 'active' army personnel in similar age-groups. The results are given in Table IV. From this comparison it is clear that weights, heights and standard deviations of the 2 groups are almost identical. It can be concluded, therefore, that the White miner does not, with increasing age, increase in weight out of proportion to the change in this regard in other groups of physically active males in the South African population of Caucasian descent.
Comparison with miners in Britain. Ward' published a useful analysis of the heights and weights of 2,160 coalminers between the ages of 15 and 50 years in the East Midlands area of England. The data were collected in the period 1952-1962. Comparison of the heights and weights of these East Midlands miners with those reported by Kensley' on another mining population in England, showed that there had been an increase in stature of 2.5 cm. and 7.5 kg. in weight in that period.

A comparison of the weights and heights of the British coalminers and the South African miners of Caucasian descent is given in Table V. In this table it is clear that the South Africans are between 3 and 5 cm. taller than the British coalminers. They are also heavier than the British coalminers. In their late teens the South Africans are 6 kg. heavier. The difference decreases to 3 kg. in the mid-twenties. The South African miners gain weight with increasing age more rapidly than do the British coalminers so that by the age of 40 years the South African miners are 7 kg. heavier.

Because of the close association between weight and height, direct comparison of mean weights, in men of different heights, can be misleading. The comparison between the South African and British miners could best be done by comparing regression lines for weight on height for different age-groups. Regression lines for weight on height are, unfortunately, not given for the British coalminers. However, a reasonable comparison of this nature can be made by plotting on Fig. 8, the mean weights against heights of the British coalminers, in the various age-groups, and comparing these weights with those on the appropriate age-group regression lines of the South Africans for the same height. This comparison shows that when the weights of the South Africans are compared with those of the British coalminers at the same height, then in the late teens the South Africans are about 1.0 kg. heavier. In the 20s this difference disappears. At the age of 30 years the South Africans are about 2 kg. heavier. It is, however, at 40 years that the South African miner increases in weight more rapidly than the British coalminer, and for the same height the South African miner is 3.4 kg. heavier in this age-group. However, as we have already pointed out, the gain in weight of the White miner in South Africa with increase in age is not unique to that occupation. The same gains in weight are seen in army personnel. We can therefore conclude that the differences in these anthropometric measurements between the 2 groups is a national characteristic. What part is played by genetic and dietary factors in these observed differences is at present a matter for speculation.

Comparison with 'standards' tables. A comparison of the regression lines for the age-groups below 20 years and 40-49 and 50-59, and the weight/height relationships for the same age-groups from the Geigy tables, are given in Fig. 12. This brings out the fact that it is entirely un-realistic to apply the Geigy weight/height standards to gauge excess weight in the South African male population. For example, even in the under-20 age-group, the mean weight of the South African is 5 kg. (11 lb.) greater than the Geigy standard for a height of 180 cm. In the 40-49 age-group the mean weight of the South African is 3.4 kg. (7.7 lb.) greater than the Geigy standard for a height of 180 cm. In the 40-49 age-group the mean weight of the South African is 5 kg. (11 lb.) greater than the Geigy standard, and in the 50-59 age-group the difference is 6.5 kg. (14.3 lb.). Most of the weight/height standards we have been able to obtain from insurance companies in South Africa are similar to the Geigy tables. However, it is clear from personal discussion with a number of insurance company medical officers, that most of them are aware of this anomaly and few of them gauge excess weight by the Geigy, or other overseas, standards.

Whether the greater weight, per unit height, of the South African male of Caucasian origin implies a greater mortality from diseases associated with obesity, such as cardiovascular degenerative disease and certain metabolic...
BLEEDING PEPTIC ULCERS IN CHILDREN*

J. LANNON, F.R.C.S. (ENG.) AND V. E. SOROUR, F.R.C.S. (ENG.), Combined Paediatric Surgical Service, Johannesburg Group of Teaching Hospitals, Johannesburg

Peptic ulcers are not uncommon in children. Paediatricians and paediatric surgeons are becoming increasingly aware of this, and in fact, ulcers in children are only regarded as curiosities by those clinicians who rarely treat children. Cruveilhier reported peptic ulcers in children in 1829. They occur equally in both sexes. An ulcer has been reported in utero. The natural history of peptic ulcers in children has been well correlated with age. In early life (2-6 years) there is a tendency towards bleeding and perforation. In the age-group 7-11 years, the ulcers are usually acute, often perforate or stenose and only rarely bleed or become chronic. In the age-group over 11 years, the behaviour of the ulcers approximates those seen in adults.

Oesophageal varices and peptic ulcers are the commonest causes of bleeding from the upper gastrointestinal tract in children.

CASE REPORTS

Eleven cases of bleeding due to peptic ulcers were seen at the Transvaal Memorial Hospital for Children and in private practice between 1952 and 1964. During this period a total of 74 ulcers were diagnosed on barium studies.

Of the 11 children with the complication of bleeding, 9 had melaena only. One baby bled on the tenth day of life. He had a pull-through operation for an imperforate anus. The child died within a few hours from a severe haematemesis. Postmortem examination revealed an ulcer in the posterior wall of the duodenum. Three of the 11 children were operated upon.

Case 1

A child of 2 years presented with a simultaneous perforation and haemorrhage. The ulcer was oversewn and the bleeding controlled. Unfortunately the child died on the fourth day. A postmortem examination revealed the presence of an abscess in the lesser sac and 3 further ulcers in the posterior duodenal wall.

Case 2

A boy of 11 years presented with a haematemesis from a lesser-curve ulcer. The bleeding vessel, as well as the right and left gastric vessels, was sutured along the line of the lesser curvature. An anterior gastro-enterostomy was performed. The patient did well in hospital but it has not been possible to do follow-up studies.

Case 3

A female child aged 5 months was admitted to the Transvaal Memorial Hospital on 15 October 1965 with a history of diarrhoea and vomiting, extending over 4 days. Before this the child had been well. She had been treated by her doctor and the stools had decreased in number and had improved in colour. However, vomiting continued and she was admitted to hospital in a state of severe dehydration. On examination nothing else of significance was found, and a drip was started. The child improved and was taking feeds on 16 October. On the second day of admission, her urinary output decreased and large melaena stools were noted. The haemoglobin was 8.5 G/100 ml. She was given blood and her condition improved slightly. The following day the stools were both red and black and the haemoglobin had dropped to 5.1 G/100 ml. Platelets and prothrombin index were normal. In view of the decreasing urinary output, a provisional diagnosis of Gasser's syndrome was made. She was again given blood and haemoglobin estimations were 7.1 and 8.0 G/100 ml. On 19 October, because of the red and dark blood, surgery was considered, with a differential diagnosis of a bleeding Meckel's diverticulum or a peptic ulcer. A barium meal revealed a normal stomach with the right and left gastric vessels, was sutured along the line of the lesser curvature. An anterior gastro-enterostomy was performed. The patient did well in hospital but it has not been possible to do follow-up studies.