prevention is to identify the members of these groups. There is a great need for a simple technique of early diagnosis.

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DISCUSSION

Dr Kearns: I am an industrial medical officer, and the discussions today have suggested to me that most of the things we are going to do to bronchitics are going to result primarily in a reduction of their absence from work. I am employed to achieve this object, among others. Many of the measures we have heard discussed—the various treatments and physiotherapy and the stopping of smoking—all seem to have this economic effect, and it does not seem definite that you in fact stop the deterioration of the man himself. Since we are not sure that infection makes him any worse, we are not sure how long these drugs will improve his situation.

May I ask if it is any value at all, and if it is a practical proposition, to vaccinate bronchitics as a group against such things as influenza or the common cold? Is there any indication that it is desirable to do this?

Dr C. M. Fletcher: The question of vaccination is difficult. The only formal trial of vaccination among bronchitics was one carried out in a large number of chest clinics some five or six years ago by the Medical Research Council. While vaccination did reduce the attacks of influenza in the bronchitics, it had no effect on the total number of spells of illness or on mortality. It seemed that bronchitics made up for what they lost in influenza by having other illnesses. On first principles, vaccination is reasonable, but there is not any really good supporting evidence. The Ministry of Health do put bronchitics in the group of special risk patients for whom vaccination may be desirable. But it seems that the inconvenience of it may not be worth the marginal benefit.

Chairman: In a practice with which I was associated, over two

years everybody over 65 could have anti-influenza vaccine if they wished to avail themselves of it. It was no trouble to give: it was almost painless. We had a 70 per cent response and 50 per cent of those with chronic bronchitis did come for three years running. I think the psychological effect is quite large. They claimed that they had less frequent and less severe bouts of bronchitis.

Dr Smith: We vaccinated the staff of the executive council for three years, and we found that absences due to respiratory disease were cut to about half: that is comparing those who were vaccinated with those who were not.

A Questioner: I have two questions. Do hook worms or round worms at the early stage, while passing through the lungs, really cause bronchitis, or is it merely that germs carried in with the worms cause bronchitis? We know that round worms do pass through the lungs and hook worms get in in meat. They get to the lungs but what harm do they do there?

Chairman: I am not sure whether we have experts from Africa here who are familiar with them.

Questioner: I will go to the other question. Is insufficient clothing a common cause of bronchitis? We know that a lot of people catch cold while waiting for buses. They feel cold and get a cold. Does that commonly go on to bronchitis?

Chairman: I do not know whether any proper study has been made of people at bus stops—of age and sex groups in bus queues. We have to wait long enough now for buses to come.

Dr Beechy: I had some experience in Nigeria, where hook worm and round worms were endemic. We used to get recurrent outbreaks of pneumonia when the larval worms broke out. You would have expected that in the old person there would be evidence of bronchitis, but I do not remember having had to deal with that sort of situation.

Dr Piper: One thing has been puzzling me today and that is that Britain leads the world in mortality with chronic bronchitis, while one of the countries practically at the bottom of the list is the U.S.A. The small experience I have of meeting American people is that they practically all smoke incessantly and this seems to me a very puzzling phenomenon.

Another surprising thing that occurs to me today is that nobody, particularly none of our experts, has mentioned the recent publication of a book by Professor Eysenck and it would be interesting to hear some of their comments on that book.

Dr Fitzgerald: I qualified in Ireland in 1926 and we saw a lot of bronchitis in students in Ireland. Then I came here and was here

for a year in Fulham where I saw a lot of bronchitis. I then spent about six years in America and worked most of my time in hospitals there. The first thing that struck me was that there was little bronchitis around New York. I saw very little of it, but I did see a lot more of pneumonia than in this country. I got that impression and I have never heard anything about it since.

Chairman: Professor Forrester of Los Angeles was here in 1957 and he told me about their difficulties in bronchitis, following our smog outbreak and a similar one in Los Angeles. Their smog was almost as severe, and those who smoked heavily got bronchitis badly. But there are on record several studies of this. There has been published in France and America, and in this country, information on bronchitis in relation to smoke and in relation to smoking. The other half of your question is still unanswered—about the book of Professor Eysenck.

Dr C. M. Fletcher: I think that that particular point can be answered. One thing that is scrupulously left out of it, I think, is any reference to bronchitis.

Dr Bennett: On the question of smoking, of course Americans smoke different cigarettes, and they cure the tobacco in a different way. Also there is now some evidence that one of the chief ingredients in our tobacco does not occur in American tobacco. Would it therefore be worth while for the tobacco firms to persuade people to smoke American cigarettes?

The other point is that Americans do not smoke cigarettes down to the stub. This was put forward originally. They tend to use filters and holders more, and tend to throw away cigarettes when they are only half burnt.

Dr Carne: I think most rational people are convinced of the relationship between smoking and bronchitis. I have also thought that we are convinced of the difficulty of persuading people to alter their smoking habits over a long period. You remember that when the Report of the Royal College of Physicians came out, there was a substantial decline in the number of cigarettes smoked. But I believe that the number has been steadily creeping up, and that it now exceeds the consumption before the Report was published. In that event, I wonder whether one of the speakers could tell us whether any work is being done, and if so what it is, on isolating the factors in cigarettes and tobacco which may be responsible for the production of chronic bronchitis?

Dr B. E. Heard: There are a number of irritant substances in cigarette smoke, for instance, formaldehyde, and these would be capable of damaging the lung.

Dr C. M. Fletcher: I think this is a matter of great importance,

If we could identify the damaging factor in cigarette smoke and could remove it, this would be one way of overcoming our problems. We have just completed a survey of 850 men working in the London Transport and engineering works at the Post Office and we have been measuring airways resistance before and after smoking a cigarette, and it is quite clear that a fraction of the population show a very striking airways resistance after one cigarette. These may be the future cases of obstructive bronchitis. What we are hoping to do is to obtain some cigarettes with special filters, which the manufacturers say they can supply us with, and we shall then see whether we can find a filter that will suppress this reaction. This is a matter for the future, but I think there is a possible line of procedure here.

Dr Michael Buchan: I have noted in Denmark and Sweden there is much more cigar smoking. Has this been correlated and made a matter for research?

Chairman: Studies must have been published there. They published studies in Iceland where there is no air pollution; but I realize that you are referring to cigar smoking.

Dr C. M. Fletcher: Olsen and Gilson did a survey of respiratory symptoms in Bornholm and compared their findings with surveys in this country. They found plenty of cigar smokers to study in Bornholm, but here there are hardly any pure cigar smokers. They found that symptoms of bronchitis were almost absent in the cigar smokers but were present in cigarette smokers; they were rather less prevalent in them than in men with corresponding cigarette consumption in this country. Cigar smokers do not seem to inhale the smoke. Whether this is responsible for the difference we do not know, but this might be the explanation.

Dr Manclark: Will Dr Fletcher indicate the relationship between allergy and chronic bronchitis? I think this is very important.

Dr C. M. Fletcher: This is a difficult one, but I think there is undoubtedly some form of abnormal bronchial reactivity in the obstructive bronchitic, as we showed in our study of reaction to cigarette smoking. If you would define ' allergy ', I might find it a bit easier to reply. If you mean allergy as evidenced by eosinophilia, then I can say that in our population survey of 1,000 men, of whom we have about 400 sputum producers, significant eosinophilia is not frequent and it has no correlation with sputum volume. None of the three main features of bronchitis—hypersecretion, infection and obstruction—appeared to be related to sputum eosinophilia in the population we studied.

Dr Kenbury: May I inquire of Dr May what antibiotic he feels is the drug of choice in the treatment of acute exacerbations of chronic bronchitis? Does he use tetracycline?

Dr J. R. May: I think the important point is that exacerbations be suppressed as promptly as possible, because the patient may be very ill. If an oral antibiotic is given there may be some delay or even some deficiency in absorption, and, with this point in mind, I would generally give an antibiotic by injection. If, however, I knew from past experience that the patient responded well to an oral antibiotic I would use that. This being so, I would normally give ampicillin by intramuscular injection or, alternatively, penicillin and streptomycin by injection. But, if one knows that a patient responds well to oral tetracycline, it is quite justifiable to use that.

Chairman: For a large number of people working in the B.B.C., I believe they are encouraging the use of a vaccine. Have you any views on this?

Dr McMullan: At the moment, no. I think I could disabuse anybody of the idea that we are using influenza vaccines. I think the idea may derive from a piece of slightly unethical publicity by a drug firm that I shall not name, which gave a quote from a B.B.C. interview, with a managing director talking to an eminent scientific figure. The quote was roughly: " Well, if there is anything one can do to reduce illness in the winter, the only thing I can think of is 'antiflu' vaccine ". But the occupational health service of the B.B.C. is not using this and in the absence of better evidence does not intend to use it at present.

What we are trying to do is to bring to the notice of our staff the dangers of smoking. We have shown an excellent film on smoking that Dr Fletcher was connected with, and this has been very well received. We showed it rather inadvisedly on the Friday before the Whitsun holiday, and no fewer than 70 people came to see it. When I asked the audience whether they smoked or not—roughly half the men and half women—interestingly enough half said they smoked and half said they did not. I assume that the non-smokers came to find out what advantages they were getting. But I am afraid we have not been able to follow up the results of doing this and personally I am rather pessimistic about advising people not to smoke. I have just come back from two weeks with the Navy. I saw a young sailor aged about 25 who was obviously heading for chronic bronchitis. He was in a mild attack, and he was smoking 40 a day. I advised him that, if he could not give up, at least he could reduce. Three days later he was down to 30 a day, and was cured by the end of the week. But he went back to 40 a day, and I know that he will go on in this way because cigarettes are very cheap for him.

Dr Chokra: I should like to ask about the pneumolytic agent in general practice. I believe it is a successful agent, but others may be

divided in their views on this.

Dr Kearns: I have two questions and the first is directed to Dr Trapnell. I think I may be clinging to old fashioned attitudes which I absorbed when a student, but it does seem to me that to subject a patient to bronchography in early bronchitis is a rather drastic procedure. I am certain that if my attitude is wrong Dr Trapenll will help me to correct it. Perhaps we can be told exactly what it involves and how long it takes. Then, I have been a little disappointed today at the lack of material on the early recognition of bronchitis. This may not be—I am certain it is not—the fault of the speakers so much as because of the paucity of evidence on the development of bronchitis. But no one has referred to bronchitis in children or at least to the relationship between the wheezy child and adult bronchitic. I wonder if one of the speakers could perhaps indicate whether there is an established relationship between the two conditions?

Dr D. H. Trapnell: I would agree that it is not necessary or justifiable to do a bronchogram to diagnose early bronchitis. I meant to indicate this. Bronchography may be useful in a small and selected group of cases, if used as an added way of persuading patients to submit to the treatment you recommend. But if you can get him to give up his smoking and do the other things you propose without a bronchogram, that is good. X-ray departments have enough work to do without a lot more bronchograms.

But it is not in fact the kind of procedure that it used to be in days gone by. We have our guinea-pig here in the form of Dr Gregg, who has submitted to this procedure, and it is not really as alarming or difficult or dangerous or time consuming as people think. I would say again that apart from our research, the only possible justification for doing it in early bronchitis is to persuade the patient of the accuracy of your diagnosis and to give him some tangible evidence to help him to give up his smoking. Otherwise it seems to me that it is confined to a research procedure.

So far as my technique goes, I prefer to do a bronchogram with a metal teaspoon. There are many different methods used by different people, including the rather older method of crico-thyroid puncture, which I think is alarming to the patient and occasionally dangerous. I simply put the contrast medium on the tongue with a teaspoon. A bronchogram normally takes about a quarter of an hour: about five minutes of which is spent in talking to the patient, to put him at ease and get his co-operation. Without that my method is doomed to failure. If one uses what might be called a blunderbuss technique and bullies the patient, one can oblige him to submit and get adequate pictures, but I do not consider this justifiable. Otherwise it takes

about a quarter of an hour, and about a further ten minutes for the processing of the films. If they are adequate that is all. It may be that for some special reason one needs to do a little more, for which one adds another quarter of an hour or maybe 20 minutes.

Chairman: The last questioner said that no mention was made of bronchitis in the child, or the early wheezing child. Bonham Carter at Great Ormond Street and University College has talked about this—wheezes and the wheezing child. He has not said a great deal more than we have observed. Quite often this child becomes a bronchitic. Perhaps Dr Emerson would like to comment on this.

Dr P. A. Emerson: This is a very important question. I do not know of any study that has followed up a group of bronchitic children. As general practitioners, you will all be familiar with these bronchitic or catarrhal children who are brought to you by their mothers. The need is to reassure the mothers that the children will get better as time goes by. I think it is very likely that many who later become chronic bronchitics, or have emphysema, have a history of trouble in childhood. This is not always so, obviously, because the majority of men who develop bronchitis later in life do so without any past history of such trouble; but I suspect that bronchitic children become adult bronchitics in a higher proportion than normal children do.

Dr I. M. Gregg: Some of the patients who had bronchograms done were referred by me. A patient who had it done on the wrong side asked to have the other done; and two others in whom we were particularly interested were approached and asked if they would agree to the investigation, and they did so. Certainly these patients were carefully selected. I explained exactly what was involved. There was not any punitive attitude, but certainly it gave them some reason for giving up smoking if they knew what was involved by its continuation.

Chairman: The enthusiasm of the doctor is directly proportional to the results achieved.

Dr J. W. Lowry: There are various methods of catching the coal tar which is the dangerous part of the smoke. For example, a filter is put in a cigarette. After 20 cigarettes it is useless. It absorbs, say 70 per cent of the coal tar which would otherwise be inhaled. It is the minimum particles of the dust of coal tar which penetrate into the lungs. It is these minimum particles which are dangerous. The larger parts of coal dust are not dangerous because they do not pass into the lung.

Question: Could we make a representation officially, as a College, for smoking to be prohibited in transport and so on? It would seem to be a main step in this matter and a practical approach.

Chairman: It would be practical, but I think it is a little outside the writ of this meeting.

Dr Gomez: Muco-polysacarides can be measured in the early bronchitic as large goblet cells just beginning, and that will be a practical way of detecting it.

Chairman: I will now call upon Dr Fletcher to sum up.

CLOSING REMARKS

Dr C. M. Fletcher: It is difficult to sum up all that we have heard today. Perhaps I can best try to summarize what we do know and what we do not know about bronchitis and then consider what we ought to do about it.

I think we definitely know that cigarettes are a cause of bronchitis. We are pretty clear about air pollution, but we do not know the relative roles of the acute episodes and the intervening lower levels. I think we are confident about the role of infection in aetiology, particularly since hearing the very interesting recent evidence which Dr Holland has presented to us about school children. We have also acquired some evidence recently that among non-smokers with a productive cough there is a much higher incidence of childhood illnesses described as bronchitis than among a comparable group of smokers with bronchitis (Fletcher 1965). It looks as if childhood infection may produce bronchitis in non-smokers who have no other cause.

There is no doubt there are susceptible and less susceptible individuals. Not all smokers get a cough and those who do must have a greater liability to get bronchitis. Is this congenitally determined? Again, we do not know. The best evidence that it may be is provided by Stuart-Harris's (1965) study in which he showed a higher incidence of bronchitis in the sisters than in the wives of patients with bronchitis. How important it is that we should discover more about the susceptibles because it is on these we need to be working.

Factors about whose effects we are in doubt are temperature, climate and sex. There is a strong clinical impression that cold and damp may encourage and aggravate bronchitis but there is no clear evidence about this. There is some evidence that women do get the