Reports

EPIDEMIC WINTER VOMITING

A Symposium by the Epidemic Observation Unit of the College of General Practitioners

"The syndrome was so uniform and striking that a special disease was suggested .... Until more is learned about this disease I suggest that this syndrome be called the winter vomiting disease ...." (Zahorsky, 1929.)

"Is there an Epidemic Vomiting Disease of Winter?" (Editorial, 1943.)

The disease was probably first described in Denmark by Jürgens (1928). In this country Miller and Raven (1936) described an outbreak in a boarding school as "epidemic nausea and vomiting" and the same title was used by Gray (1939) to describe an October outbreak both in a girls' school and among the general population of Hayling Island. He formed the opinion that the disease was due to an unknown air-borne filterable virus; other authors have in general agreed with this view. Bradley (1943), after studying a large outbreak in October and November among schoolgirls and related families, was able to show that the disease could not have been caused by an item of food consumed immediately preceding the attack. Dummer (1953) was the first to use the title "Epidemic winter vomiting" to describe an outbreak occurring in November, but McKinnon (1954) writing from Australia makes the point that "Winter Vomiting is not a very good name here as the attacks are often seen in summer, but goldfish spawn in November here as in England, without reference to the season."

The great majority of papers deal with outbreaks in closed communities who were thought to be suffering from food poisoning or dysentry. Bradley states that "although the disease is of minor significance clinically and economically, it may give rise to considerable administrative uncertainty," especially to those who are "unfamiliar with the clinical and epidemiological picture." That many are unfamiliar is not surprising, since cases are unlikely to be admitted to a teaching hospital and at least one well-known medical textbook is without any reference to this syndrome. Indeed, as a result of the College investigation we know now that this is a disease seen primarily by general practitioners, less often by the Public Health Medical Service and scarcely ever by consultants.

To a member of the research register of the College belongs the credit of having published the first paper about this disease from general practice, namely Dr. J. F. Goodall (1954). He was primarily interested in distinguishing it from "gastric flu," a diagnosis which the patient and his friends are all too willing to accept. The need to make such a distinction has been emphasised by Dr.

G. S. Wilson, Director of the Public Health Laboratory Service, in a letter dated 15th November, 1954: " In one or two places the winter vomiting disease has occurred simultaneously with gastric influenza, and we are uncertain as to the part played by virus B in the causation of these acute illnesses accompanied by gastro-intestinal symptoms. In our experience the winter vomiting disease is usually practically afebrile. On the other hand, gastric influenza seems to be accompanied by an appreciable rise in temperature. The relation between the two diseases, however, needs much further study than we have been able to give it so far, and I hope we shall be able to get material from outbreaks which you bring to our notice so that we can see whether virus B is associated with any one particular clinical type."

The Present Investigation

During the first week of November, 1954, an epidemic of winter vomiting occurred among the children of Peaslake in Surrey and enquiry among neighbouring practitioners showed that similar cases were being seen or heard of around Guildford. Correspondence with the chairmen of the research committees of neighbouring faculties, asking whether they or their immediate colleagues were seeing similar cases, showed that the disease was widely but not uniformly distributed.

METHOD. Experience gained in 1953, when trying to trace the spread of a pyrexia of unknown origin (for reference called " Shere fever "), suggested that the same method might be applied in the present instance by issuing a " Red Warning " (*Research Newsletter*, 1954, **6**, 23) to all members of the Epidemic Observation Unit, which includes the whole research register of the College. This notice, which set out the clinical picture and to which a notification form asking for both positive and nil returns was attached, was sent out in the third week of November, 1954. Nil returns, dated, are important in this type of work where an attempt is being made to trace the distribution and spread of a disease; where a doctor had already seen cases, two details only were required—the earliest date on which cases had appeared in the practice, and whether a few or several cases had been seen. (In counting the total cases recorded by the unit, " few " was counted as " less than five " and " several " was counted as " ten or more." In some reports actual figures were given.)

RESULTS. As a result of this investigation, a total of approximately 1,300 cases of epidemic winter vomiting in 120 local outbreaks were recorded by 106 general practitioners and their consultant or public health colleagues. These reports confirm and illustrate how " uniform and striking " is the pattern of this disease, whether

it occurs sporadically or in family or school outbreaks. Fifty-three other general practitioners reported having seen no cases.

Clinical Features

" Typically the cases have given the following history and course: sudden onset of vomiting (often in the night), vomiting repeated 6 to 12 times during the next 12 to 24 hours; even drinks of water were vomited. The symptoms rapidly subsided within 24 hours and the child was apparently normal within 48 hours of onset. Physical examination during the acute stage showed a pale child, usually bright and not looking very ill. Temperature was normal or slightly raised, the tongue coated, the pharynx slightly injected. The abdomen was soft and there was no tenderness. Usually many small shotty glands could be felt especially in the posterior triangle of the neck. In some few cases there has been headache and even photophobia but no other neurological symptoms have been reported. Some cases complained of abdominal pain." (P. S. Kennedy.) These several points about the clinical course were amplified by other doctors.

VOMITING. (*a*) *Onset.* Dr. G. Gibbens records the time of first vomiting in each of 27 cases in a girls' school. He confirms that this occurs almost invariably during the night (Dummer, 1953; Goodall, 1954), 18 out of the 27 cases vomiting for the first time between 9 p.m. and midnight; most of the others earlier and only one after daybreak. The commonest time for onset seemed to vary on each of the ten nights. Thus the two cases which occurred on the first night began vomiting at 7 p.m. and 7.30 p.m. respectively. A few nights later ten cases began; one at 8 p.m., six at 9 p.m., one at 9.30 p.m., and two at 10 p.m. On the last night all three cases began at midnight. Dr. J. C. Graves recorded the times of contact and of onset of symptoms in a family outbreak involving ten cases and noted " the constancy of the time of the attack starting although the time of contact varies." (See details below on page 86.)

(*b*) *Duration.* " In one child vomiting lasted 12 hours but in all other cases had ceased within 6 hours." (F. A. Bevan.) . . . . " Vomiting occurred from 2 to 14 times and extended over 6 to 8 hours. The vomiting was always painless and children felt perfectly well and hungry within 3 to 4 hours of the vomiting ceasing." (D. Laing.) . . . . " The length of time of actual vomiting seems longer as age increases. For example, adolescents extended to more than 12 hours, younger children to more than 6 hours." (R. G. Gibson.)

DIARRHOEA. " Not a single case had diarrhoea though a few girls said that the bowels had been opened once rather easily." (G. Gibbens.) . . . . " In all cases it was afebrile and in only one

case was there diarrhoea." (Professor R. Illingworth.) . . . . "Vomiting has been the most pronounced symptom and there have been very few cases with diarrhoea as well, though the tendency is for the adults to get diarrhoea." (P. A. Walford.) . . . . "The diarrhoea attacked the child and not the adult." (M. S. Kay.) . . . . "In a school the later cases had less vomiting but had diarrhoea which the earlier cases did not show at all." (Winifred Symonds.)

In America the association with diarrhoea seems more frequent than in Britain. (Reimann *et al.*, 1945.)

VERTIGO. "To the signs and symptoms set out in the leaflet I would like to add one finding present in all the adult cases: there is vertigo on head movements and there is coarse nystagmus in the end position. The eardrums are normal. I venture to suggest that we are dealing with a labyrinthitis . . . . After five days all have felt well and the nystagmus has ceased." (W. Kirchenberger.)

OTHER SIGNS AND SYMPTOMS. "There were no physical signs to report, no fever, no diarrhoea and no upper respiratory infection. Only a little colic before the vomiting and no sequelae." (Winifred Symonds.)

"The digestion of fat by the children is upset as well as there being some irritability of the bowel." (M. S. Kay.)

DURATION OF ILLNESS. Dr. Edwards reported a series of 21 cases with an age range from 2 to 86, of both sexes, in which the duration was 24 hours to 5 days; "the duration lengthened with age." . . . . "Children have cleared up completely in 24 to 48 hours. Many adults have tended to have nausea lasting for up to a week." (A. C. G. Long.) Panton (1953) also noted that the duration lengthened with age.

TREATMENT AND RECOVERY. There is general agreement that complete recovery is the rule and that, especially in young children, this occurs within 6 to 12 hours. There is also general agreement that treatment in the acute stage is neither necessary nor possible; as a rule anything taken by mouth is immediately vomited. Treatment of the subsequent dehydration may be necessary in a few cases.

RELAPSE. This has been noted in previous papers but in this series there are only two reports each of two cases relapsing 4 or 5 days after the original attack; all other doctors who specifically mention the point state that recovery has been complete.

LABORATORY INVESTIGATIONS. (*a*) *Faeces.* From three series, two in schools and one in a family, 25 specimens of faeces were examined; the results were all negative. (W. V. Cruden, G. Gibbens, G. I. Watson.) In another area "there were seven cases within a few days in October which fitted the clinical picture, but

three of them were eventually shown to have *S. typhimurium* in the stools." (I. Cookson.)

(*b*) *Garglings.* An opportunity was taken to get garglings from two adult patients during the acute attack. The report from Colindale on these two specimens was as follows: " influenza viruses A, B or C were not isolated from either of these specimens." (G. I. Watson.) . . . . " Dr. J. even went to the extent of swallowing filtered gargles from cases of the illness, but he suffered no ill effects." (W. V. Cruden.)

(*c*) *Blood.* Complement fixation tests were done on 11 specimens of blood, five of them from the adult cases reported below (para. vi, p. 86). These were all negative for influenza A and B, Q fever and the psittacosis L.G.V. group (W. Symonds and K. A. Misch of the Department of Pathology, Lister Hospital, Hitchin; G. I. Watson).

Family Outbreaks

AGE INCIDENCE. " The majority of cases have been in children and many exposed adults have escaped." (P. A. Walford.) . . . . "All ages including babies." (J. Price.) . . . . " Owing to the incidence of bonus notes in a mining practice such as this it is difficult to ascertain the incidence of such a fleeting disease . . . however the general impression I have received recently is that there are an unusual number of men, mostly aged 20 to 40 complaining of fleeting attacks of vomiting with occasional diarrhoea and very occasional headache or abdominal pain." (J. S. Laurie.) . . . . " I had a total of 15 children and 32 adults . . . . The relatively small number of children is explained by the fact that the disease is of short duration and I may not have been called to all the cases. Also my practice is an industrial one and therefore all adults would call me straight away for the certificates they needed." (W. Kirchenberger.)

CASE INCIDENCE IN FAMILIES. " The distribution is queer, the cases are scattered all over the town, and there is in all cases only one member of the family affected." (W. Kirchenberger.) . . . : " There were several isolated cases in large families without spread to the others." (B. J. Foster.) . . . . " No secondary case was noted in any house though there were siblings in all five." (E. G. Cohen.) . . . " It is noteworthy that in about 60% of cases no other person in the household was affected in spite of the fact that no effort at isolation had been attempted." (P. G. J. Kennedy.) This was a point which Goodall (1954) mentions in his paper. " Of our 46 patients 35 were the only sufferers in a household." . . . ". . . . two other doctors' families were affected in this area at

about the same time. In both families the fathers escaped but the mothers and children were affected." (Malcolm Tate.)

THE PATTERN OF A FAMILY OUTBREAK. " This family who live in a farmhouse on a main road about 3 miles from the nearest village consists of father aged 30, mother aged 27, and three girls aged 5, 3, and 11 months.

Monday, 23rd May, 1955.	*Mrs. A.* who comes to clean at the farmhouse on Wednesdays and Saturdays, started vomiting in the evening and continued until the following morning. She had last been at the farm the previous Saturday, but had sufficiently recovered to return to work on the Wednesday, 25th May, in the morning.
Thursday, 26th May.	*Mrs. L.* (housewife) started vomiting quite suddenly at 7 p.m. and continued until 11 p.m. Spent most of the next day in a chair, but almost recovered, although still had a severe backache.
Sunday, 29th May.	*Mr. L.* (farmer) visited friends for an hour or so (Mr. B.). On returning at 9 p.m. started vomiting and diarrhoea until 4 a.m. Prostrate next day, but recovered by Tuesday except for backache.
Tuesday, 31st May.	*Mr. B.* (friend) " unwell " on Tuesday night with abdominal pain. No vomiting as far as known.
Wednesday, 1st June.	*Janet L.* aged 5 (daughter) started vomiting from 7.30 p.m. to 9 p.m. " Off colour " next morning but fully recovered by noon.
Thursday, 2nd June.	*Mr. and Mrs. C.* (brother of Mr. L.) who had visited the L's on Tuesday, 31st May, " were vomiting all the evening." (No further information.)
Saturday, 4th June.	*Miss C.* aged 4 (neice of Mr. L.) vomiting in the evening. (No further information.) *Mrs. D.* (mother of Mr. L.) vomiting in the evening. *Mr. D.* (father of Mr. L.) abdominal pain in the night. (Both had been in frequent contact with both the L's and the C's.)

" For the sake of clarity each family has been given a separate letter although it will be seen that they are nearly all related. It should be noted that the two smallest children of the L's were not attacked although at risk. Mr. D. is reputed to have a weak stomach and be prone to sickness, although he was not so in this attack." (J. C. Graves.)

INCUBATION PERIODS AFTER KNOWN SHORT CONTACT WITH THE DISEASE. A number of doctors have been able to record examples of a secondary case following on a known short period of contact with a primary case.

(i) "28*th November*, 5 p.m.: two cases of epidemic winter vomiting visited by me. 30*th November*, 5 a.m.: developed epidemic winter vomiting myself: first symptom vomiting." (C. Starey.) Incubation period—36 hours.

(ii) " *Thursday*: family A went to tea with family B. During that night the child of family B was sick several times; she did not seem febrile. By the morning she had apparently recovered and

had a normal breakfast . . . . *Sunday*: in the early hours of the morning the daughter of family A awoke and attempted to be sick at repeated intervals. The retching continued for about 6 hours. She was not febrile and slowly recovered during the afternoon . . . . The father of family A got up that same morning feeling vaguely unwell. This feeling became progressively worse until by mid-day he was sick. He then recovered during the afternoon by resting in bed. He had no temperature or subsequent bowel upset." Other members of family A were affected later. (M. S. Kay.) Incubation period of about 60 hours.

(iii) The father and mother and two children of family Y took ill with the disease between 6th November and the evening of 7th November, 1954. " It is of interest that over the weekend of 6th and 7th November there were four relatives visiting this family and the husband's father fell ill with the same complaint late on the 7th; the wife's mother on the 9th; the husband's mother on the 10th and the husband's brother on the 10th. A friend called late on the evening of the 7th to visit this family for a short while and he developed the condition on the 9th." (E. A. W. Marien.) The shortest incubation period here must have been about 36 hours and the longest not less than 3 days.

(iv) "22*nd March*: a child of 5, together with two small neighbours, had an attack of vomiting. 24*th March*: the mother of this child succumbed and was ill for about 12 hours. 27*th March*: the father of the child succumbed. He may not have been infected by his daughter as he was out at work all day and probably took the infection from his wife. 27*th March*: my patient, a man of 24, visited the house of the above three and was in contact with the father of the child. I have not been able to find out if he was a contact of any other patient in the village. Having gone to bed quite well he woke up at about 2 a.m. on 29*th March* in an apparently typical attack of this disease." (F. A. Bevan.) Incubation period 36 hours.

(v) "A boy of 6 vomited in the evening after his birthday party which lasted from 4 till 6 p.m. on 26*th March*. On 28*th March*, three unrelated children who had been at the party each vomited in their own homes, one at tea-time and two at about 10 p.m. Incubation periods 48 to 54 hours. One of these children, aged 6, had a typical attack as a secondary case in 1952 when his elder brother was affected, but did not succumb when his younger brother had an attack in November, 1954, though they share bedrooms. Nor did his younger brother have a second attack in March, 1955." (G. I. Watson.)

(vi) "About 3.30 p.m. on *Thursday*, 18th November, a girl of 5 went to meet her friends at a school where there was an out-

break of this disease. At 4.30 p.m. on *Saturday*, 20th November, she vomited at a party in her own house. Incubation period 48 to 49 hours. Five out of the six people who were present at that party subsequently had an attack of vomiting and the interval between the party and the vomiting in secondary cases varied with the closeness of likely contact between the child and the subsequent cases, all of whom share a sitting-room. Her mother vomited 32 hours after the party, an uncle staying on weekend leave in the same house vomited at his R.A.F. station 34 hours after the party, her father about 42 hours after, her grandmother (who lives in another part of the same house) 48 hours after, and her aunt (who lives in a flat in the same house) vomited 54 hours after the party. The grandfather who had recovered from an attack of what he called ' gastritis ' three weeks before was the only contact not to be affected." (G. I. Watson.) This series suggests that the child was infectious for a few hours before and possibly after the party.

Mode of Transmission and Duration of Infectivity. It may be taken as established that this disease is normally transmitted by personal contact, that the duration of contact need only be short and may be less than an hour, and that the infective agent is air-borne rather than carried by food or drink. Proof is still lacking that this agent is a filterable virus, though some experimental work in America did yield " strongly suggestive results " (Reimann *et al.*, 1945); nor is the seat of infection known, whether this is in the gastro-intestinal or respiratory tracts or even in the central nervous system. (Gray, 1939; Bradley, 1945; Raffles, 1954.)

Cases appear to be infectious both before and after the onset of vomiting (Watson, 1954, and several reports in this symposium). " The period of infectivity seems to be at least 8 hours before the onset of vomiting . . . . The incubation period seems to be longer with the first cases or else they remained infectious for a fairly long time." (M. S. Kay.)

Immunity. No further observations were made with regard to immunity to subsequent attacks. Development of immunity has been suggested (Watson, 1954) and this is probably the explanation for the appearance of scattered solitary cases in young (non-immune) children during a prevalence in any district, without the development of secondary cases among those exposed; where family or school immunity is lacking a larger outbreak can occur.

Differential Diagnosis

The differential diagnosis of this disease from others in which vomiting occurs depends in part on whether one is dealing with a solitary case or an epidemic.

Solitary Cases. " One hears of cases only incidentally, several

days after the onset: owing to the brevity of the symptoms one is seldom called to see actual sufferers" (A. Pearce). Perhaps winter vomiting disease should be one of the last, not the first, possibilities to be thought of when dealing with a sporadic case of vomiting which is severe enough for the doctor to be called. In children, simple dietary indiscretions, vomiting at the onset of acute fevers, or that due to acute surgical emergencies such as appendicitis or obstruction are likely to be commoner causes. The repeated nature of the vomiting, its sudden onset during the night in a child who was well at bedtime, and the absence of abnormal physical signs in the abdomen between bouts of vomiting, are all points in favour of the winter vomiting disease. Vomiting is the rule in the prodromal stage of infective hepatitis in children (French, D. G., 1954); but it is not so frequently repeated and the appetite does not promptly return. Among more important causes in adults are surgical emergencies, coronary thrombosis, or an intra-cranial lesion.

NUMEROUS CASES. (*a*) *Food Poisoning.* When frequent vomiting occurs in several people within a short period of time, the most important problem for decision is whether food poisoning has occurred or not; particularly poisoning by staphylococcal toxin, if vomiting rather than diarrhoea is the predominant symptom. A general practitioner who is epidemiologically minded can do a great deal to hasten an early decision about the nature of such an outbreak. The following are extracts from reports of those who have had to investigate outbreaks suggestive of food poisoning:— "Distribution around the school showed no relation to contact in dormitories or at table." (W. Symonds.) . . . . "I was unable to trace a common source of food or drink, and in any case the two youngest children, one year and 18 months old, had all their water, milk, etc., boiled." (F. A. Bevan.) . . . . "Two of the kitchen staff had an attack of vomiting on Saturday, 4th December, in the afternoon and evening, and did not, after they were taken ill cook any meal which non-residents ate. It appears therefore that the epidemic was started in the kitchen, and that the incubation period was about 48 hours. The non-residents must have been infected by contact with the kitchen staff, not by infected food, and the kitchen staff must have been infectious before they showed signs of the disease." (D. Laing.) . . . . ". . . the hands of all food-servers were examined for possible staphylococcal foci: none was found. No food-server was, or had been, ill. Apart from these negative findings for ordinary causes of abdominal upset, the time interval is very unlike that of a food-borne infection." (G. Gibbens.)

(*b*) *Gastric Influenza.* "In this area we expect the succession 'gastric flu' (winter vomiting disease), followed by sporadic

ordinary influenza, followed if we are unlucky by an explosive outbreak of influenza." (J. A. Currie.) " It is hard to separate these cases from other types of influenzal illness occurring at the same time but not in the same house." (E. O. Walker.) " There is some winter vomiting disease about as well as influenza, but it is difficult to be certain of this when there are only a few cases." (N. B. Eastwood.)

" The vomiting disease and influenza overlapped and caused some confusion, because in the children, especially, vomiting was part of the influenza picture in about 40% of cases. Those with this disease did not quickly recover, however, and a temperature of 102°F. has been common for 4 or 5 days. Vomiting commenced at the beginning and often pharyngitis as well, then after 2 or 3 days a hard cough has developed without signs in the chest. . . . Epidemic winter vomiting occurred in young schoolchildren and attacked quite a proportion of the children at the schools, as I found out afterwards from the mothers of my patients. The attack was typically short-lived, frequent vomiting occurring about once per hour or two hours with colic and even prostration, coldness and a sub-normal temperature. After about 12 hours the child became much better and was all right in 24 hours. There was no diarrhoea so that even though we have had some dysentery in the town right up till now, since the summer, it cannot have been that disease." (R. Yager.)

"A number of cases which could be described as ' epidemic winter vomiting' have been seen by me during a very heavy epidemic of virus B influenza. In a school of 70 children I have had 58 ill in bed. Five or six have had isolated attacks of vomiting, occasionally also a single loose motion, but no fever; the other children have had fever up to 105°F. cervical glands, enlarged, sore throats, dry coughs, nose bleeding and otitis media." (June Alexander.)

" The first case of epidemic winter vomiting occurred on 25th March, 1955 . . . . The school had a large epidemic of ' flu ' in February. I think it really was influenza—a large proportion of the girls were slightly cyanosed, and aureomycin had not the slightest effect . . . . The girls who were most ill then, were not the most ill in this affair: there appears to be no relation whatever between the two diseases." (G. Gibbens.)

A report kindly sent by Dr. E. Bebbington, M.O.H. of Beeston and Stapleford U.D.C. and used with his permission, describes an outbreak of illness in that area in 1954, serologically confirmed as due to influenza virus B. He reviews the symptomatology of a total of 165 cases, 78 girls and 87 boys. There was no marked difference between the boys and girls in the frequency of their symptoms. The following were the symptoms in order of frequency:

headache 78%, cough 74%, cold in the nose 70%, sore throat 63%, weakness 40%, fever 37%, nausea 36%, pain on coughing 33%, shivering 33%, sweating 30%, pains in arms, legs or back 26%, pain in stomach 18%, vomiting 10%, diarrhoea 10%. " Investigation has shown that vomiting, when it did occur, did so usually on the first day of the illness and that the patient usually vomited once or twice. The vomiting was not precipitate, diarrhoea was most prevalent on the first day but in some cases lasted 2 or 3 days, and in one case a full week."

(*c*) *Epidemic Vertigo.* Five doctors have reported seeing cases showing severe vertigo: (i) " several cases of . . . epidemic vertigo in November." (J. D. Craig, Ormskirk, Lancs.) (ii) At least 15 adults in December, four of whom were middle-aged. (W. Kirchenberger, Derby.) (iii) Three out of six adults in November. (M. E. Lampard, Colchester). (iv) " Two cases last week (early December) had acute repeated vomiting for a few hours and were afebrile, but also had true vertigo. One had very marked nystagmus, and I regard this syndrome as infective labyrinthitis." (I. Cookson, Hucclecote, Glos.) (v) One case in December. (G. T. Edelsten, Winchester.)

(*d*) *Other Diseases.* The disease this year " appears to be much milder than the local outbreak which interested me two years ago. Then, the disease usually lasted 2 to 3 days, a child vomiting for a day or two, often with marked abdominal pain, large, bulky, frothy, smelly, putty-coloured stools and dark urine, in a few cases of which there was bile present. There was usually a mild pyrexia and the symptoms cleared in 2 or 3 days but the putty-coloured motions continued for 5 to 10 days, sometimes up to three weeks. Examination in these cases was always negative, so were throat swabs and routine laboratory faeces examinations, which were done on most cases. The adults affected had similar symptoms, but rarely the smelly motions of the children, and appeared to be less severely affected. The children usually took 1 to 3 weeks to regain their normal health. No virus laboratory investigation was carried out in these cases . . . in a few adults an icteric index was done and was normal." (E. A. W. Marien.)

The Disease in the Country as a whole, 1954/55

What is known about this disease has largely come from studies of localised outbreaks in closed communities such as schools, hospitals, etc. (Reimann *et al.*, 1945.) Our aim was to study the disease as it appeared in general practice, with special reference to its seasonal incidence and its spread from one locality to another.

(*a*) *Seasonal Incidence.* Zahorsky noted that " the disease occurs in widespread epidemics during the fall and winter months. It

does not occur in the summer months . . . ." All the outbreaks so far reported in this country have fallen within these limits. Miller and Raven, March, 1936; Gray, October, 1938; Bradley, October, 1942; Webster (1953), October, 1950; Silverton (1952), December, 1950—February, 1951; Dummer, November, 1952; Goodall, January, 1953.

In our survey it was recorded that a few cases of this syndrome had been seen in July, 1954, at three, possibly four, quite widely separated localities, namely London, Writtle near Chelmsford, Lincoln and Devonport. No fresh outbreaks were encountered during August or the first part of September. In mid-September several cases were recognised in Cheshire and from then on until the end of October the disease was reported as having appeared in several new localities each week. From the beginning of November a steep rise in the incidence of new reports began, but how long this continued after the third week of November it is not possible to judge from our survey, which was designed primarily to show the distribution of the disease at the time of our enquiry and retrospectively, rather than as a means of continuous observation. However, further records did come in from those, who at the time of our original enquiry had not seen similar cases. In this way we learned that fresh epidemics of winter vomiting continued to appear during December, that it " finally made its appearance in Glasgow " about the the second week of February, 1955 (S. Gunn), and that it spread through Devon and Cornwall at the end of February and the beginning of March, 1955; reports of five fresh outbreaks in this area were received within three weeks of each other. At the end of March also the disease reappeared in a practice in Surrey where it had been prevalent in the first week of November, 1954, but no child was seen in a second attack in March who had already been affected in November. Cases have also occurred again during May, 1955, in the practice at Writtle in Essex previously affected both in July and November, 1954.

(*b*) *Duration of Local Epidemics.* A number of doctors confirm that in their area the epidemic seemed to pass after a few weeks almost as suddenly as it came. Zahorsky had " encountered these epidemic waves many times . . ." and noted that " the duration . . . is from two to four weeks, rarely longer."

(*c*) *Geographical Spread.* From July until the beginning of November, 1954, there were only ten reports of outbreaks of this disease in areas outside the Home Counties but 19 such reports from London and the Home Counties including Sussex. Among the ten reports from the rest of England there was a geographical concentration of three of these in the area north and south of the Humber, and

two reports came from near Birmingham, one to the north and one just to the east; the remaining five were widely separated and came from Devonport, Hythe near Southampton, Cirencester, Wallasey and Workington in Cumberland. The increased incidence of the disease during the first half of November was largely contributed by the Home Counties, with some increase in Hampshire, a moderate increase around Birmingham, a small increase around Liverpool and a scattered increase north and south of the Humber; the disease appeared to be spreading northwards. By the end of the third week of November the position was reached which is shown in the table. From four counties had come only positive reports: ten from Essex, seven from Hampshire, five from Sussex and four from Hertfordshire. Surrey returned one negative out of 16 reports, but Kent did not seem to have been so heavily infected by that time and out of 12 reports four were negative. London too returned five negative reports out of 11. During this time most of the south of England was free of epidemic influenza.

With regard to the negative reports, there were areas where these were likewise more abundant. For example, 11 out of 12 reports from Somerset, Cornwall and South Wales were negative and only one positive. On a line from Flamborough Head to Birkenhead there were seven reports, one positive in September, two positive in November and four negative. North of this line there were 12 reports, ten of them negative. All five reports from Scotland were negative, though " gastric influenza " was reported from Edinburgh. During the time of this survey virus B influenza was prevalent in the north of England and spreading southwards.

Unfortunately the picture cannot be completed because there were some large areas of the country from which no reports were received. In particular this applies to the counties around the Fens, including South Lincolnshire, West Norfolk, Rutland, Northamptonshire, Huntingdonshire, Cambridgeshire and West Suffolk. Another smaller area comprises North Wales and Anglesey.

In areas where records were numerous it is interesting to look in more detail at the dates on which this disease was first recorded by doctors in adjacent practices. For example, out along the Dover road from London the disease was reported as first seen in Dulwich on 12th October, Dartford on 8th November, Gillingham and Sittingbourne both on 15th November, Canterbury on 20th November and Dover on 3rd December. North of the river the same pattern is repeated: one of the July reports came from Plaistow, E.13, and another from Writtle near Chelmsford; there were two reports of the disease being present in Ilford during early October and at Hornchurch in October; thereafter it was reported

at Basildon on 20th October, at Felstead on 26th October, at Writtle (reappearance) on 1st November, at Thaxted on 11th November, at Southwold on 15th November and at Colchester before 18th November. From other parts of the country also, one got the impression of the disease becoming suddenly prevalent in the area. For example, there were two positive reports from south-east of Leeds, two from Sheffield and two from Worcester; in two practices near Bournemouth the disease first made its appearance on precisely the same date in November.

WEEKLY TOTALS OF NEW REPORTS OF EPIDEMIC WINTER VOMITING, BY AREAS

Week No.	37	38	39	40	41	42	43	44	45	46	*Totals at Week No. 46* Positive	Negative
Surrey	...	...	2	–	1	1	–	3	4	4	15	1
Hants.	...	...	...	...	1	–	–	2	4	1	7	0
Sussex	...	...	...	...	...	1	–	–	2	2	5	0
Kent	...	...	...	...	...	...	1	2	1	4	8	4
Postal District of London	...	...	...	2	1	–	–	–	–	3	6	5
Essex	...	...	...	1	1	2	2	1	1	1	9	0
Herts.	...	...	...	...	...	...	...	1	3	–	4	0
Middlesex	...	...	...	...	...	...	...	...	...	1	1	1
Birmingham Faculty	...	...	1	–	1	–	–	1	3	5	11	4
Yorks Faculty	...	...	...	1	–	1	–	1	2	2	7	8
Rest of England	...	1	–	–	1	–	1	1	1	5	10	19
Wales	...	...	...	...	...	...	...	...	1	–	1	4
Scotland	...	...	...	...	...	...	...	...	...	*	0	5
Ireland	...	...	...	...	...	...	...	...	1	–	1	1
TOTALS	0	1	3	4	6	5	4	12	23	28	85	52

*" Gastric influenza " reported.

Discussion and conclusions

This investigation was designed for two purposes: first, as a new exercise in collective epidemiology to study the distribution and spread of a non-notifiable infectious disease, which within the practice limits of any one doctor appears as a thief in the night and may be gone again almost before being seen. Our second aim was

to familiarise ourselves with a disease, whose cause is still unknown, so that, if in future an opportunity arises, we can help to obtain the necessary pathological material on which virus research could be undertaken.

The first object was achieved to an encouraging but incomplete extent. We now know that this form of infectious vomiting may be either sporadic or epidemic; in epidemic form it may affect only one child in each of several houses or a whole family or school. We know, too, that it may be widely prevalent in the absence of serologically positive influenza or, if concurrent with epidemic influenza, a distinction can usually be drawn between typical cases of influenzal vomiting and of this other form; and that an attack of virus B influenza does not confer immunity against an attack of the winter vomiting disease even during the same season. Furthermore we were able to define some areas of the country where the disease was widely prevalent in the autumn of 1954, to follow its spread into other areas previously free from the disease, and to show that while epidemics occurred in the autumn and early or late winter, cases or limited outbreaks did still occur even in spring and summer. We therefore agree that the title " winter vomiting disease " is not appropriate but suggest it should be retained until the causal agent is identified.

Our second objective continues to be sought and it is hoped that publication of this symposium will encourage others to study more closely what is a common though neglected syndrome—neglected alike by our teachers and writers of medical textbooks, by those with facilities for virus research and (let it be admitted) by general practitioners ourselves.

We can perhaps claim that there now exists a body of general practitioners sufficiently interested in and familiar with this syndrome to help in collecting specimens for basic research into the infective agent should these be required. What better time to do this than the autumn, when epidemics of the disease can be expected and when both general practitioners and laboratories alike may hope for a respite between the poliomyelitis and influenza seasons? " The discovery of a group of enterotropic viruses would perhaps open a field of investigation of as much importance as that pertaining to the newly recognised virus-like infections of the lungs " (Reimann *et al.*, 1945). The recent news of another group of serologically identifiable viruses, given on p. 120, lends point to Dr. Reimann's hopes, and The Epidemic Observation Unit of the

College may prove to be a useful instrument to anyone setting forth on this discovery.

Summary

(1) This is the report of an exercise in collective epidemiology in which 159 general practitioners took part.

(2) The first objective, to study the distribution and spread of a non-notifiable infectious disease during an epidemic, was achieved within certain limits.

(3) The second objective, to familiarise a large group of general practitioners with the clinical features of " the winter vomiting disease," continues to be sought so that, when an opportunity is found for basic research into the unknown cause of this disease, the necessary pathological material will be readily collected.

(4) Incidental to these activities, the clinical features of this disease as it appears in general practice were more clearly defined.

(5) During the autumn of 1954 the area of maximum prevalence and the direction of spread of " the winter vomiting disease" were different from those of virus B influenza, confirming that the two diseases are quite distinct.

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In this symposium, a name given in parenthesis after a quotation refers to the member of the Unit from whose report the extract has been taken.