KIT KAT CLUB 1·21·03

INFLUENZA

"Pale horse, pale rider, done taken my lover away" – Katherine Anne Porter

By George Paulson, M.D.

In chapter six of Revelations four horsemen are mentioned, now traditionally labelled war, famine, pestilence, and death. They appeared on the first four seals of a scroll when the seven seals are opened. "Before me was a pale horse. Its rider was named Death".

Death, even more certain than taxes, has always been with us. Columbus lost thousands in five episodes of cholera in the 1800's. Older doctors who worked at Children's Hospital in the 1930's recalled wards filled with children with polio. We have seen glimpses of how a handful of real cases of anthrax, or a potential for millions of cases of smallpox affects the United States. But we've almost forgotten the pale horse, the pale rider of 85 years ago. The pandemic of influenza in 1918 destroyed more individuals than were killed by all the cannons on the front. "Pandemic" means widespread, and in 1918 it was worldwide, disease. I will tell you about viruses, this virus, and Ohio as it met the pale rider. I used the newspapers sheltered in Gary Ness's place at OSH, the one guarded by the old doughboy, to get the figures. Chris Duckworth, the editor of *Timeline*, who is here, was the one who encouraged me to do it.

Influenza is an acute viral infection of the respiratory tract causing inflammation of the nose and upper airways and commonly associated with fever, chills, and muscle aches. The lungs can be damaged and become vulnerable to secondary and more lethal infections with bacteria such as staph or pneumococcus. Most patients are well in 10 days. Well, that is, unless the lungs, heart or brain are permanently damaged.

The word virus once meant "poison" and what is this poisonous enemy? Viruses divide, multiply, and survive only within the cells of their host. Their genetic components can change and mutate. Living within the cells, viruses are shaped like rods, spheres, or little tadpoles, and most have a distinct structure. They are called animal, bacterial, or plant viruses, but they can also be labeled by how they are transmitted (as tick borne), or by their effect on the nervous system (polioviruses), or even by the town where they were first identified (Norwalk or St. Louis encephalitis).

The influenza viruses are usually classed as A, B, or C types, with A and B strain producing illness in humans. Influenza A viruses are sub-classified by the nature of their surface glycoproteins (sugar and protein compounds), and as of two years ago, 15 hemagglutinin (HA), and neuroaminidase (NA) subtypes had been identified. I'll spare you the subtypes, but all have been found in birds, three in humans.

Why are the viruses so successful? It isn't just that they live off a host, unless they kill the goose or the man. Their surface glycoproteins can change and the person is susceptible to the new strain even if he had a prior immunity. Some leap from one animal to another. The 1918 flu came from a pig virus with crossover to humans. Wild birds may live without symptoms from the viruses they carry, but the migratory birds can infect man's turkeys or chickens. In

Hong Kong in 1997 influenza virus H5N1 killed many chickens, and then killed six of the 18 humans that became infected. Killing all the chickens in Hong Kong seems to have halted, at least for now, this particular virus.

Perhaps from China in March of 1918 the new virus began to appear in mid-western U.S. military camps. Tissue from two soldiers who died of influenza in 1918, plus viruses from an Inuit woman confirmed that the 1918 pandemic was caused by influenza A type H1 N1. The woman died when influenza struck her village in 1918. It killed 85% of the adult population that liveed there within five days.

Over 60 pandemics influenza have been reported since 1173. Significant pandemics occurred in 1957, 1968, and 1977, but the most severe ever was in 1918 and 1919. Five hundred million persons were affected and up to 40 million died. These were not babies or old frail people Most were robust. The reason for the intense virulence of the virus may always remain obscure. It seems probable that what was often called "the Spanish flu" never really started in Spain. Spain was neutral at the time, and early reports of the new illness in Spain were not being censored as they were for the rest of Europe. Regardless of where the flu of 1918 actually originated, it is clear that when it once arrived families were destroyed and entire villages were decimated. India lost nine million people. The 1918 flu killed more in a short time than have died of <u>any</u> one illness in the history of mankind. In the U.S. Army 1.4% of all the soldiers were killed within four months. This viral enemy was more efficient, more mysterious, and more deadly than the Germans.

Record keeping was often disrupted, not well done in Ohio, and secondary infections were common and often listed as the cause of death. Millions worldwide were debilitated by war, some were almost inured to death, and then everyone had to face this new and unexpected pale rider. The life expectancy for Americans in 1917 was 51 years, but dropped to 39 years in 1918. Vital services were interrupted at a time 50% of the population was ill at one and the same time. In October 1918 the "<u>American Journal of Public Health</u>" said: "Hunt up your woodworkers and cabinet makers and set them to making coffins. Then take your street laborers and set them to digging graves. If you do this you will not have your dead accumulating faster than you can dispose of them".

What do we know about epidemics, is the knowledge in one DNA, just as the viruses are in one cell? The AIDS epidemic, Ebola, the West Nile encephalitis, and the controversy in 1975 when we underwent national immunization for a swine flu epidemic which never occurred, but which led to $800,000,000 in plaintiffs fees for G-Barre illnesses that were not truly related to the vaccine, has reminded our population of the potential for mass mortality. Science fiction, doomsday novelists, and environmental activists have all warned of future devastation, disease, and death. Nevertheless until now, no assault, even before the Black Plague has killed so many so quickly, and then in time disappeared so thoroughly, as did the influenza epidemic of 1918. The epidemic even affected the war effort and perhaps shortened the war. Scientific questions remained unanswered.

Is there a gradual enhancement of virulence during a so called epidemic? How does the DNA structure correlate with virulence? The first episode of the so called "Spanish flu"

appeared four months earlier, it seemed more innocent? What was the role of animals or of insects? Does the experience in 1918 offer our generation insights for the current AIDS epidemic? Did visceral memory of 1918 lead to the ill fated swine flu debacle of 1975. The question tonight is more mundane and can be answered. What did the flu mean to the United States and to Ohio?

In 1918 influenza was not a reportable disease in Ohio and precise diagnosis was often difficult. It can be hard to distinguish sniffles or a cold from influenza, but our people soon learned that flu tended to hit more rapidly and was more likely to be linked with aches, high fever, and chills than was true of more benign illnesses. There was a sudden onset of fever combined with prostration out of all proportion to the fever, plus headache and backache. Clusters of ill soldiers were soon sent home from recruit camps but during the so called milder "three day fever" of the spring and later during the terrible return of flu in the fall of 1918, most military posts bedded down multiple cases of what was then called "knock me down fever". In retrospect even in the spring episode young and healthy adults seemed particularly vulnerable. As was known influenza is transmitted from human to human without detectable influence by animal or insect vectors, and crowding of the military and mass movements spreads the disease. By September of 1918 the numbers of the ill had dramatically exploded in Africa, Europe, and America and it was apparent that a totally new disaster was at hand. There was plenty of other news to distract Americans at the time. Babe Ruth was pitching, and pitching well. The suffragettes were still agitating. The war in Europe occupied the front pages, but by September no one could ignore 50,000 new cases of influenza in Massachusetts, nor in that state the 123 people who had died of influenza. By September 28th 1,100 service men had died, and in the next month 700 more people would die in Philadelphia in a single day. A new song appeared for little girls jumping rope, "I had a little bird and its name was Enza. I opened the window and in flew Enza".

The first cases in Ohio were reported the last week in September 1918 in Washington Court House and Chillicothe. These originated from nearby Camp Sherman and soon brought the epidemic to New Concord, Ohio. State officials reported that over 9,000 Ohio deaths from influenza occurred before the end of October. Citizens came to doubt the experts since for the preceding two months newspapers regularly predicted a "soon" end of the epidemic. The Ohio Department of Health in December estimated the overall death toll for Ohio at almost 20,000, total cases numbering well over a million. In February 1919 the number of total deaths in Ohio from influenza was raised to 22,000, almost all within three months.

Public health officials had learned years earlier that an influenza outbreak usually continues until 40% of the population had have the disease, no matter what preventive measures were adopted. Surges are as brief as six weeks. The peak for Ohio was reached in October and November. It was a good thing the epidemic then did subside because by the middle of December federal funds for Ohio had run out, and of the 80 physicians initially employed by the United States Public Health Service in Ohio 76 were released. Public health agencies and local hospitals discovered the value of quality nursing, and social work came into its own as a speciality. Public health departments at local levels, generally less well organized in Ohio than in other states, Wisconsin for example, launched special efforts to educate the public and to facilitate the reporting of influenza cases. The public was urged to assure proper cleansing of

utensils used in public eating and drinking places. Needs for adequate record keeping became apparent. Vaccination practices were quite properly still considered to be barely developmental for influenza in 1918. What about the individual communities in Ohio, how did they fare?

Mt. Sinai Hospital in Cleveland reported 548 cases of the influenza, and 373 with significant pulmonary complications. Cyanosis, or blue skin, was characteristic of some patients. Many complained of headache, sweated profusely, and most had chest pain. There were 20 pregnant women at Mt. Sinai who acquired the influenza and 12 of these women, or 60% died.

The newspapers suggested caution about exposure, limitations of theaters, to avoid crowding, and eliminate perpendicular drinking fountains, and assure adequate By October 12, 1918, the Ohio State Health Department formally ordered numerous closings. The entire Ohio State University Campus was closed except for the student army training corps. We were still at war, remember. Schools, churches, theaters, motion picture houses, and dance halls were almost all closed by October 11th, but the concert that week in Columbus by Mme Galli-Curci, the "wonder soprano", was allowed. All the windows of the Columbus Memorial Hall were to be left open while the wonder performed..

The Cincinnati Inquirer reported on November 1st, 1918 "The epidemic influenza situation in Ohio is improving, and in the opinion of the State Department of Health we may soon reasonably expect to reach practically normal conditions for the state at large." Only 374 new cases and 73 influenza deaths were actually reported on that particular day in Cleveland, November 1st, and everyone did begin to feel encouraged. Isolated areas such as prisons, ships, mountain tops, and monasteries can be spared during an epidemic, but Xenia Ohio on October 31st reported the death of children at the Soldier and Sailors Orphan Home with five-hundred children ill.

Cincinnati was hit hard. Cases developed among the military students at the University of Cincinnati, and the city health authorities advised against resumption of military training at the University. By the end of October the total death toll in Cincinnati had already reached 646, and a new ruling forbade public funerals. The patients were all individuals remember; it is people who die, not just numbers. The Cincinnati paper recorded that Kline Menefee Jr., a senior student at the Ohio Miami Medical College died of pneumonia, induced by influenza. Menefee had volunteered his service to treat the influenza cases at the hospital. The 23-year-old Menefee had been a leading student in his class, and was survived by his father and uncle, who were both physicians. His widow survived him. Katherine Anne Porter beautifully described her own near death experience, and the loss of a lover, in the influenza epidemic in her novel Pale Rider, Pale Horse said: "... something, somebody was missing, she had lost something, she had left something valuable in another country, oh what could it be . . . Where are the dead? We have forgotten the dead, oh, the dead, where are they?"

Things improved, of course, even in Cincinnati, and by November 4th the Hamilton Board of Health announced that churches could be reopened, moving picture shows again permitted on Friday and Saturday. Public schools opened the following week. Nevertheless, the Cincinnati headlines still read "The ban will continue". Only 30 new cases were reported on November 4th. There were another 23 deaths. These raised the total of deaths in six weeks in Cincinnati from

influenza to 713. The fire department of Cincinnati was hit hard. Eight members had died of influenza, and 139 had been stricken. Since 100 firemen were still off duty there was temporary abandonment of several fire stations. Children were now orphans, including one family with five children ranging from 3 to 11 years old. On November 11th, memorable as Armistice Day, Cincinnati public schools were allowed to reopen. The 17,000 parochial school children went back to school approximately a week later than did the public school students.

What of central Ohio? Columbus was close to Camp Sherman, near Chillicothe, and the first cases in Ohio were among the servicemen at this camp. In 1918 Camp Sherman included 33,004 people of whom 8,531 were "colored". Among this population 10,979 became affected by influenza and many developed intense cyanosis, bubbling respiratory insufficiency, and delirium. Pneumococcal disease was the predominant bacteria at the time of death. Initial medical reports fail to mention the total number of deaths, but a later summary stated that already by October 5th 576 had died at Camp Sherman. DJ Vincent, a prominent elderly Columbus physician who grew up near Chillicothe, remembers as a 6 year old boy slipping into a warehouse to see the bodies from Camp Sherman lying out in rows. "I can't forget the tags on their big toes". He also remembered bloody fluids flowing into the gutters as embalming proceeded on the dozens of young men. On October 4th when the first death in Columbus occurred, it was Mrs. Flossie Buntz, 27 years old, having been "ill but a few days". The first doctor on the scene was a woman physician, Dr. Enielle Gorell.

The Dispatch claimed that Columbus had the lowest death rate from influenza among 20 large cities of the country, at least as of the first week in November. Philadelphia had sustained over 7 deaths per 1000 infected, the mortality in other cities such as Baltimore and Boston and Syracuse were also high, but in Ohio was only 5.8 and in Columbus only 5.1 per 1000. The State Department of Health was concerned for the men employed in the Belmont coal fields, many of whom were foreigners who resented the new regulations such as the opening of windows. "Many foreign children are sewed up in their winter garments when cold weather comes and these garments are not removed until spring." Saloons were still closed in Columbus early in November but by the second week of November it could be reported that only a single death had been reported on that Sunday, compared with 11 in a single day of the preceding week. By November 15th it was announced that all Sunday Schools were still to be closed but that the ban for Columbus City Schools was lifted. Attendance was not compulsory. On Thursday of that same week nine cases of influenza were reported and there were five new deaths. The Dispatch of November 20th offered continued evidence that the epidemic was not totally over since 49 new cases and two deaths were reported and one day prior there had been 76 new cases with 13 deaths.

On November 22, 1918 the cumulative deaths from the disease within the Columbus city limits was 473, but it was clear that the total number of milder influenza cases would never be known. Again the town fathers cheerfully claimed that the average number of deaths was lower in Columbus than in other metropolitan centers.

By the first week of December in 1918, John Keegan, Secretary of the Ohio Board of Health stated with sad confidence that more than half of the recent deaths in Columbus had resulted from influenza. In October there had been a total of 616 deaths of all causes and at least

320 of these people had had influenza. In November the number had been 459 deaths, with 235 attributed directly to influenza. Each was of course an individual, and no one can truly measure what our communities and individual families lost. The epidemic was indeed subsiding by December 1918, but many ill people still remained in hospital. The Ohio State Journal on December 8, 1918 reported that every member of the family of Frame Brown was ill with influenza. "Mr. and Mrs. Brown and their 5 year old daughter, Molly, are at Mt. Carmel Hospital." Molly had been with her uncle's family for Thanksgiving. By Monday all were in the hospital and her aunt and one of the children soon died. No family member was well enough to go to the funeral. Molly survived and lived to welcome in the year 2002 as Molly Brown Caren Fisher, an energetic and beloved philanthropist. The Molly who survived has been an active member of a dozen boards including the Columbus Children's Hospital Board and Capital University, and a legendary leader for musical and artistic groups in her hometown of Columbus. In her later years she not only gave a 992.8-acre farm to The Ohio State University, but took equal delight in competing with OSU students in courses of agriculture. What would it have meant if there had never been a Molly Brown Caren Fisher in Columbus? What gifts did our entire state miss through the deaths of the 20,000 who died of influenza in 1918?

Influenza couldn't be cured then, or now, of course, and how well did our physicians do? The Ohio State Medical Journal offered little comment regarding the epidemic. Dr. E.W. Mitchell did suggest, on one page, that influenza is the most contagious of all diseases since it is transmitted through the air by droplet infection and also suggested use of a handkerchief and to keep the sweat glands open by hot baths. He correctly pointed out there was no value from the vaccines available at the time. The doctor also suggested citrate of soda, lemonade, and orange juice. His overall program included confinement to bed, windows wide open, a glass of Vichy water every three hours, a hot tub bath once or twice daily, and nose and throat to be sprayed every two hours. The bed rest, at least, was probably helpful.

In the same issue of the State Medical Journal Captain Charles Higgins of Zanesville, Ohio, pointed out that the death rate from "grip" was higher than that from diphtheria or croup. He emphasized that influenza affects much more than the respiratory system, and therefore the old term "catarrhal" was not sufficient. He expressed regret that so little laboratory experimentation had been done on this disease, except for fruitless searches for a hypothetical "germ". He properly insisted that symptomatic treatment remained the only viable approach and that rest in bed was still the best therapy. There wasn't much written in science but patent medications were touted to treat influenza. These included substances such as Dr. Bells' Pine-Tar Honey, Dr. Jones' liniment (beaver oil), Millers' antiseptic oil known as "Snake Oil", Nostriola, Tonsiline, and 27 similarly fancy sounding and presumably similarly non-efficacious compounds.

By September of 1919, almost a year after the epidemic, the medical editors in Ohio rejoiced that Ohio had lost 2,081 less people in 1918 than it did the year before, but this was true only if one left out those that died of influenza. The total mortality for the year of 1918 was officially placed at about 90,000, a number which excluded the over 20,000 that had died of influenza or a secondary pneumonia. As a symbol of the time tuberculosis still was called captain of the "men of death", with 7,649 people dying in Ohio of tuberculosis in all its many manifestations.

As we face new epidemics it is remarkable that old ones don't stay intensely etched in our cultural memories. Why? "An epidemic of yellow fever with the loss of thousands of lives spread over a considerable territory would throw the whole country into a panic. A dozen cases of plague in a seaport town would cause the same kind of excitement; but it is remarkable to see the placidity by which the people have generally taken the almost sudden loss of 300,000 lives . . .this per the Assistant Surgeon General". There may be more citizens in Philadelphia who can discuss the famous yellow fever epidemic of 1793 than recall the deadly influenza of 1918. Crosby suggests the failure of the epidemic to kill off a really famous person, President Wilson for example, accounted for the remarkable calm of our citizenry. At least as likely was the numbing effect of war and the fact that the epidemic affected friend and foe alike. There were wild rumors to the contrary, but influenza was not a new secret weapon of the "Huns". There was surely a major impact on individuals, on everyone, an impact that is hard to measure. Crosby quotes one man who as a seven year old in 1918 watched one of the numerous funerals go by said "I knew then that life was not a perpetual present, and that even tomorrow would be part of the past, and that for all my days and years to come I too must one day die." How many must have learned that as children in 1918.

I mentioned the fact that not much was written by the doctors of Ohio about the flu, but they did predict it would not return after 1919. The physician editors could not, however, resist including a formal complaint about chiropractic advertisements that appeared during the epidemic, advertisements which stated that the chiropractic death ratio during the epidemic was only 1:886 cases in contrast to 10 per 1000 with other treatment.. "Chiropractic has succeeded where all other methods have failed. Keep your spine in normal conditions and you can afford to laugh at the flu." In actual fact, of course, no one in 1918 laughed at the flu. Nevertheless, may the medical editors be right, and may this strain never return again. But what if it does?

Within the past 20 years scientists have developed the tools to identify major genetic shifts in the influenza viruses, and new vaccines can be prepared to protect the population as the infection begins to spread. Vaccines can never cope completely with all the changes the flu virus can produce. Antiviral drugs, similar to antibiotics for bacterial infection, are being developed and it is the recent study of the structure and biochemical properties of the surface of the viruses which makes this approach probable, not just possible. Compounds that inhibit the enzyme neuraminidase, for example, will also inhibit multiplication of the virus. We may not know why a virus can become virulent, and we can not prevent the often subtle shifts of infection from animals to man, but perhaps in our own time those scientists who have not forgotten the potential for another pandemic will protect the rest of us, and our children, from ever having the experience the citizens of Ohio had in 1918.