An Overview of The Epstein Barr Virus (EBV) and Mononucleosis

William F. Vincent, Ph.D.
Clinical Microbiologist Consultant
Quest Diagnostics
Wallingford, CT

Historical
Long before the terms “infectious mononucleosis” and Epstein-Barr virus came into being, physicians in the early 19th century were describing an illness known as glandular fever which was characterized by fever, sore throat, swollen lymph nodes and fatigue. The illness, as we know it today, was described in 1889 by German physicians. The term “Infectious Mononucleosis” was first used by Sprunt and Evans at Johns Hopkins in 1920 since the disease appeared to attack mononuclear leukocytes (today known as lymphocytes). The virus was discovered and documented in 1963 by Anthony Epstein and Yvonne Barr of the University of Bristol in England.

The Virus
The Epstein-Barr Virus (EBV) is actually the Human herpesvirus 4 (HHV-4) and it is a member of the Herpesviridae family of the DNA virus. In addition to infectious mononucleosis, this family of virus is also responsible for chicken pox, shingles and colds. EBV is a relatively complex virus and is not yet fully understood even after years of intensive study.

A mature EBV particle has a diameter of 120 to 180 nm. Its genome is comprised of double-stranded, linear DNA that is enclosed by a protein capsid. This, in turn, is surrounded by a protein tegument, which is then surrounded by a lipid envelope.
The virus, continued

Negatively-stained transmission electron micrograph (TEM) of numerous Epstein-Barr virus (EBV) virions, members of the Herpesviridae virus family. EBV is also known as Human herpesvirus 4 (HHV-4). At the core of its proteinaceous capsid, the EBV contains a double-stranded DNA (ds DNA) linear genome Courtesy of CDC

The virus can enter and infect both B-lymphocytes and epithelial cells. The mechanisms for these entries, however, are different. Under certain circumstances, the virus can infect T-lymphocytes, natural killer cells and smooth muscle cells. The term "viral tropism" is used to refer to situations such as this where a virus can infect a number of different cells.

Leukemia cells that contain Epstein Barr virus stained using a FA staining technique
Courtesy of CDC

EBV isolates can be divided into two major types: EBV type 1 and EBV type 2. This division is made on the basis of different EBNA-3 genes. Type 1 is predominant throughout most of the world except in Africa where both types are equally prevalent. Distinguishing one type from the other is not a simple process, however, and requires splitting the viral genome with a restriction enzyme and then examining the patterns of the resultant products by gel electrophoresis.

The life cycle of EBV in the body is actually quite complicated. And is shown on the next page.

Want to contact A Quest Diagnostics Representative?
If you would like a Quest Diagnostics representative to call on your office or facility, you can use the links below to arrange for such a visit.

For a physician representative, click here.
For a hospital representative, click here.
EBV LIFE CYCLE
Courtesy of Herpes fact or fiction
**Associated Diseases**
EBV has been implicated in a number of diseases in addition to infectious mononucleosis. These include:
- Burkitt’s lymphoma
- Hodgkin Lymphoma
- Nasopharyngeal carcinoma
- Multiple sclerosis

The major symptoms of infectious mononucleosis include:
- Fever (usually 100.4°F or higher)
- Sore throat – this is usually one of the first symptoms. The tonsils become swollen and develop a whitish-yellow covering
- Swollen lymph glands especially in the neck and arm pit. Very distinctive feature of most infections
- Drowsiness, tiredness, fatigue
- Loss of appetite
- Rash
- Swollen spleen

In addition to those listed above, there are a number of other symptoms which are occasionally noted. These include: cough, nosebleed, rapid heart rate, photosensitivity, shortness of breath and chest pain.

EBV is not the only virus that is associated with the infectious mononucleosis syndrome. Occasionally, cases are caused by the Cytomegalovirus (CMV).

Occasional complications occur. The most common is a bacterial infection of the throat (usually “strep” sore throat). Hepatitis with jaundice may occur but is more common in persons over 35 years of age.

Heart involvement and central nervous system involvement are quite rare and does death occur. There does not seem to be any instances of problems during pregnancy.

**Epidemiology**
Both sexes are equally affected and the disease may affect persons of any age. The highest frequency, however, is in the 20 to 25 year-old bracket. In communities of young persons (such as colleges), epidemics can occur. When adolescents or young adults become infected, the symptoms of mononucleosis occur about 35 to 50 % of the time.

Infectious mononucleosis is referred to as the “kissing disease” since the major mode of transmission is via saliva and transmission of the virus usually requires intimate contact with the saliva. Transmission by blood, urine and feces is probably quite rare. Also, the virus doesn’t appear to be transmitted via aerosol droplets.

Every year, thousands of teenagers acquire mononucleosis. It is estimated that by the age of 30, 95 % of the population will have come in contact with EBV. Most cases will be very mild or asymptomatic.
In some instances, the patient will develop a life-long dormant infection. In these cases, the person may develop Burkitt’s lymphoma or nasopharyngeal carcinoma later in life. These sequelae, however, are generally not found in the U.S.

**Diagnosis**

When a patient appears to have many or all of the symptoms associated with mononucleosis, the most common tests that are ordered are a complete blood count and the “Mono-Spot” heterophile test. Patients with mononucleosis will almost always have an increased white blood cell count (WBC) due to a significant increase in the number of lymphocytes. 10 % or more of the lymphocytes will be “atypical” or “reactive”. Under the microscope, they will look like somebody hit them with a small hammer. This morphologic change is presumably due to interaction with viral particles.

During the acute phase of the disease heterophile antibodies can be detected using the Mono-Spot. These antibodies, however, disappear rapidly after about Week 4. False-positive tests do occur in a small number of patients and 10 to 15 % of patients may have a false-negative test. These usually occur in patients under 10 years old.

**Treatment**

There is no specific treatment for mononucleosis. In mild cases, the patient should be advised to avoid any strenuous activity and get lots of bed rest (very important!) until the symptoms subside (usually about two months). In more serious cases, the patient should be on bed rest for one to two weeks after the symptoms appear.
Strenuous sports should be avoided for several months after onset since a blow to the abdomen could result in a ruptured spleen and a life-threatening situation.

The sore throat associated with mononucleosis can be treated by gargling with salt water or mouth wash. Bland foods and non-citrus fruit drinks also help.

**Infection Control**

As long as kissing is as popular among young folks as it is, it’s going to be pretty hard to come up with a practical plan for infection control.

Since roughly 95% of adolescents and teenagers become infected with EBV (most of them asymptomatic), it is difficult to formulate any infection control practices that would be of value.

**Selected references**


Mayo Clinic staff. 2010. Mononucleosis. Click here to access website.


National Center for Infectious Diseases, Centers for Disease Control and Epidemiology. 2006. Epstein Barr Virus and Infectious Mononucleosis. Click here to access website.


**Other Infectious Disease News**

**Focus Diagnostics and 3M launch FDA-cleared Simplexa™ Test on 3M™ Cycler for molecular influenza and respiratory virus testing by moderate complexity healthcare facilities**

**October 9, 2012** – Focus Diagnostics, a business of Quest Diagnostics, and 3M, a global diversified technology company, today announced that the U.S. Food and Drug Administration (FDA) has provided 510(k) clearance and CLIA moderate-complexity categorization to the Simplexa Flu A/B & RSV Direct test on the 3M™Integrated Cycler.

The new test aids in the qualitative detection and differentiation of RNA of influenza A and B viruses and respiratory syncytial virus (RSV), common causes of respiratory illness. Focus Diagnostics, maker of the Simplexa™ brand of molecular test kits, and 3M™, maker of the 3M Integrated Cycler technology, developed the test through an exclusive global collaboration. The collaboration, formed in 2009, has produced several Simplexa molecular tests, including the first FDA-cleared commercial test for the influenza A H1N1 (2009) virus.

The Simplexa Flu A/B & RSV Direct molecular test is the first moderate-complexity molecular test from the Focus Diagnostics’ Simplexa product line, significantly broadening potential clinical access to the Simplexa/3M technology. Moderate complexity laboratories, defined by the Clinical Laboratory Improvement Amendments (CLIA), include certain types of physician’s offices, community hospitals, health clinics and integrated delivery networks. These facilities typically lack the personnel and technology to perform high-complexity molecular diagnostic tests. Since the test can be performed in these moderate complexity labs, patient results may be obtained readily to help speed therapeutic decisions.

“The future of influenza and all respiratory virus testing is molecular diagnostics, given its potential for high sensitivity and fast reporting of test results, which are essential for patient management,” said Jay M. Lieberman, M.D., Medical Director, Infectious Diseases, for Quest Diagnostics and Focus Diagnostics. “The clearance and moderate complexity categorization of the Simplexa test on the 3M Integrated Cycler signifies an important step forward in expanding access to near-patient molecular testing, potentially helping clinicians to make better decisions for their patients.”

The new Simplexa test was developed with funding from The Biomedical Advanced Research and Development Authority (BARDA), within the Office of the Assistant Secretary for Preparedness and Response within the U.S. Department of Health and Human Services. It supports the development of new technologies with potential to be effective medical countermeasure products for public health emergency threats. BARDA awarded a $5.9 million contract for the test’s development.

“We are pleased to be part of this development that brings near-patient quality molecular testing to localized healthcare settings, and see it as evidence that public-private collaborations can produce important medical technologies” said Tom Cole, Global Marketing Manager.
for 3M Infection Prevention Division. “The availability of this test to a broad swath of healthcare professionals in the U.S. will no doubt advance the diagnosis and management of many patients this coming Flu/RSV season.”

Influenza and RSV are contagious respiratory illnesses caused by viral infections. While influenza and RSV produce relatively mild disease in most healthy individuals, they may cause severe respiratory disease or death in certain populations, including young children and older adults.

The “McGeer Criteria” for infections in The Elderly Revised

The McGeer criteria for classifying infections in the elderly as “nosocomial” have been used by infection control practitioners for close to three decades.

Like all good things, there comes a time when documents (including guidelines) have to be updated. When the original McGeer criteria were developed in 1992, the Committee took the CDC surveillance definitions for nosocomial infections in acute care settings and adapted them to meet the needs of long-term care. At that time, there was very little literature available on infections among the elderly.

The next guidelines and definitions are considerably more extensive than the original ones. This is particularly true in the case of urinary tract and respiratory tract infections. Also, special definitions have been developed for norovirus and *Clostridium difficile*-associated infections.

We would strongly suggest that those readers who are involved in infection control in long term care facilities click the link in the reference below and print these criteria out now.

This writer hopes to be able to put together a power point show this winter that would be appropriate for healthcare professionals in long term care facilities. We will make it available for anybody who can use it. Watch for the link in a later issue.


"Gut" feelings matter when Diagnosing Infections in Children

If a physician has a gut feeling that a child is seriously ill, the possibility of an infection should most definitely be considered.

Among 3,369 children who didn’t seem to have a serious illness, six (0.2 %) were later admitted to the hospital with the diagnosis of serious infection. Yes, the number is low but, without the physician’s gut feeling, they would have been missed.


Pets may harbor Serious Drug-resistant Microorganisms

There is a great deal of worry throughout the world about the next generation of “superbugs”. These are extended-spectrum, beta-lactamase producing gram negatives (ESBLs) which also produce an enzyme that is capable of hydrolyzing the carbapenems. The carbapenems were the last group of drugs that were available to treat ESBLs.

One such enzyme is called “New Delhi Metallo-carbapenemase” (NDM-1). This enzyme hydrolyses all the penicillins, cephalosporins and carbapenems. The strain of *E. coli* that produces it was found in Sweden in 2008 and was isolated from a patient from New Delhi, India.

Investigators recently tested 100 isolates from animals that demonstrated decreased susceptibility to the cephalosporins and carbapenems. They found four isolates that had the NDM-1 gene.

They are worried that this type of microorganism among cats and dogs could eventually represent a hazard to humans in terms of difficult-to-treat infections.


We are still "overusing" Antimicrobials

One of the problems about antibiotic usage is that we don’t really known by how much about where and how the usage is affected by season. Researchers at the Graduate School of Public Health at the University of Pittsburgh recently studied usage in older adults using the Medicare Part D data bases for 2007 through 2009.
The Southern part of the country had the highest rate of antibiotic use at 21.4%. The lowest rate was found in the Western states at 17.4% per quarter.

They found that highest usage was in the first quarter of the year (January through March) at 20.9%. The lowest rate of usage was in the third quarter (July – September) at 16.9%. This seasonal variation didn’t seem to be associated with the number of infections. The regions with the highest use, however, seemed to have the lowest rates of pneumonia.


Zhang, Y. et al. 2012. Geographic variation in outpatient antibiotic prescribing among older adults. Archives of Internal Medicine E-published on line before print. Click here to access complete article.

Decontamination of The Gut by Probiotics
First of all, just what is a probiotic? Probiotics have been defined by the Food and Agriculture Organization of the World Health Organization (WHO) as live microorganisms that, when administered in adequate amounts, confer a health benefit to the host.

Researchers at the Lawson Health Research Institute in London, Ontario, Canada feel that probiotics can and should be considered as a means of degrading heavy metals and sequestering toxic chemicals. They point out in a review that appeared in Applied and Environmental Microbiology that better than half the toxic metals and other toxins actually stay in the gut and do not cross over what is commonly referred as the “intestinal barrier”.

Researchers hope to design a study to see how probiotics will affect the absorption of these substances from Africa’s Lake Victoria which is the world’s second largest fresh water lake. This lake is known to be contaminated by numerous toxic substances.


Vaccine may Reduce Severity of Staph Infections
Because of the numerous strains of Staphylococcus aureus in nature, making an effective vaccine would be a daunting task. The vaccine would have to contain over 19 “superantigens” in order to achieve any kind of effectiveness.

Investigators at the University of Maryland found that patients who developed S. aureus sepsis had significantly lower antibody (IgG) levels towards staphylococcal exotoxins than did patients who did not become septic. A vaccine against a few select toxins will not prevent staph infections but would hopefully reduce their severity considerably.


New SARS-Like Virus may have come from Bats
In the November 2012 issue of Infectious Disease Update, we reported that five cases of a new coronavirus had been identified in the mid-East. The symptoms associated with this virus were quite similar to those associated with the SARS virus n 2003-2004.

Writing in the New England Journal of Medicine, investigators at the Erasmus Medical Center in Rotterdam, Netherlands, using genome sequencing, report that this coronavirus is very closely related to the bat coronavirus HKU4 and HKU5. In an accompanying editorial to this paper, it was stated that this new virus is not considered to be a public health risk at present because there is no evidence that it can be transmitted between humans.

Zaki, A. et al. 2012. Isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia. New Journal of Medicine Published on line before print. Click here to access full article.

World Health Organization (WHO). 2012. Frequently asked questions on novel coronavirus. Click here to go to website.

Sources of Foodborne Norovirus Infection
The most common sources of foodborne Norovirus infection are leafy vegetable, fruits and nuts and mollusks.

According to the Centers for Disease Control and Prevention (CDC), food handlers are responsible for half of the Norovirus outbreaks. Of the Norovirus outbreaks that occurred in commercial settings, 62% occurred in restaurants, 11% were associated with catering establishments and 4% involved a grocery store.

The most common foods associated with these outbreaks are:

- Leafy vegetables 33%
- Fruits and nuts 16%
- Mollusks (shellfish) 13%


New Class of Antibiotics may be Available for Treating Staph Infections
PolyMedix in Radnor, PA has developed a new class of antibiotics known as "small molecule defensin mimetics". These drugs will basically mimic the body’s own host defense proteins.

The first one, Brilacidin, is presently undergoing clinical trials and looks very promising. The cure rates associated with this drug are equivalent to those associated with Daptomycin for soft tissue and skin infections. The drug has not yet been tested with other types of staphylococcal infection. There were no liver, kidney or other toxicities associated with Brilacidin.


Vitamin D and The Common Cold
Have you ever heard it said? “Take lots of vitamin D and you won’t get a cold”.

According to researchers in New Zealand, this may be more fiction than fact.

In an article that appeared in the October 3rd issue of the Journal of The American Medical Association, researchers at the University of Otago found that persons who took large levels of Vitamin D didn’t have any less colds than persons who didn’t. Additionally, the severity of colds remained unchanged.


Free CME/CEU credits
Rotavirus: new challengers, new opportunities. Click here to access offering
Clinical course in HCV - 2012. Click here to access offering
Short-course amphotericin works in Cryptococcus. Click here to access offering.
Key step lacking in preventing perinatal Hepatitis B transmission. Click here to access offering
New drug cuts MDR-TB deaths. Click here to access offering
New virus may have come from bats. Click here to access offering

New Class of Antibiotics may be Available for Treating Staph Infections
PolyMedix in Radnor, PA has developed a new class of antibiotics known as "small molecule defensin mimetics". These drugs will basically mimic the body’s own host defense proteins.

The first one, Brilacidin, is presently undergoing clinical trials and looks very promising. The cure rates associated with this drug are equivalent to those associated with Daptomycin for soft tissue and skin infections. The drug has not yet been tested with other types of staphylococcal infection. There were no liver, kidney or other toxicities associated with Brilacidin.


Vitamin D and The Common Cold
Have you ever heard it said? “Take lots of vitamin D and you won’t get a cold”.

According to researchers in New Zealand, this may be more fiction than fact.

In an article that appeared in the October 3rd issue of the Journal of The American Medical Association, researchers at the University of Otago found that persons who took large levels of Vitamin D didn’t have any less colds than persons who didn’t. Additionally, the severity of colds remained unchanged.


Free CME/CEU credits
Rotavirus: new challengers, new opportunities. Click here to access offering
Clinical course in HCV - 2012. Click here to access offering
Short-course amphotericin works in Cryptococcus. Click here to access offering.
Key step lacking in preventing perinatal Hepatitis B transmission. Click here to access offering.
New drug cuts MDR-TB deaths. Click here to access offering
New virus may have come from bats. Click here to access offering

News Credits
William F. Vincent, PhD, Senior Editor
Frances A. Vincent, BSN, RN, Associate Editor and Nurse Consultant
Mervyn Rimai, MD, Medical Consultant
Neena Singh, MD, Medical Review
Lucy D’Angelo, MHS, Compliance Review

Published monthly by Quest Diagnostics. All inquiries, suggestions and comments should be addressed to William F. Vincent, PhD, Quest Diagnostics, P.O. Box 420, East Granby, CT 06026-0420
Tel. 800-982-6810 Ext. 7158
Fax 860-653-3276
E-mail: William.F.Vincent@QuestDiagnostics.com

Quest Diagnostics Infectious Disease Update December 2012 119
The earliest settlements in Bagshot, England were originally thought to be late Saxon, and the name Bagshot probably derives from BACGA (or Baga or Bacca), either a personal name, that of a tribe, or of a small wild animal (badger or fox). The second part (shot) is thought to be either an angle, corner or strip of land; or that it means "the tribe of". Recent excavation, however has shown that there was both pre-Roman and Roman occupation of Bagshot. There were late Bronze Age settlements in the area, and iron smelting appears to have been a major "industry" in the locality.

It was, however, in Elizabethan times (late 16th century) that the village of Bagshot prospered due to its position on the main London to the West Country route (The Great South West Road). As with many villages on main coaching routes, Bagshot developed services and stables to provide the coaches with fresh horses, and inns for the thousands of stagecoach passengers who passed through each year. Of these, only 'The Three Mariners' survives in something like its original form, retaining many early features. It was also along the great South West Road that a relay of coaches took the news of the victory and death of Nelson after the battle of Trafalgar in 1805.

The prosperity of the Great South West Road, however, created its share of highwaymen and the demand 'Stand and deliver!' rang out particularly loudly in deserted places like Bagshot Heath. One of the most notorious highwaymen was William Davis (1627-1690), a local farmer who lived near what is known locally as the Jolly Farmer roundabout. Unfortunately, subtlety was not one of his strong points and he aroused suspicion by always paying his debts in gold! He was eventually caught at the White Hart Inn in Bagshot, was hanged at the local assizes and afterwards hung in chains on Bagshot Heath. A public house called the 'The Jolly Farmer' once stood on the roundabout but it is now a golf shop. Claude Duval, the son of a miller from Normandy France, frequented Bagshot heath and it was here, supposedly, that the most famous episode of his career was written about by William Pope in 1670, shortly after his execution. According to Pope, Duval held up a coach with a nobleman and his lady. The lady took out a flageolet (a small woodwind instrument) and played. Duval thereupon took out one of his own and played as well. He commented to the noble that his wife played extremely well, and would, no doubt, dance just as well, and asked her to dance. They danced on the heath and when they were done Duval escorted her back to the coach. There he remarked that her husband had neglected to pay for the music, and stole four hundred pounds from him. Duval was hanged at Tyburn (London) on 21 January 1670, aged just twenty-seven.

James Whitney of Stevenage started life as a butcher until necessitous circumstances came on him apace, and he gave himself up to villainy. When Whitney was a confirmed highwayman he one day met a gentleman on Bagshot Heath, whom he commanded to stand and deliver. To which the gentleman replied: "Sir, 'tis well you spoke first, for I was just going to say the same thing to you." "Why, are you a gentleman thief then?" quoth Whitney. "Yes," said the stranger; but I have had very bad success to-day; for I have been riding up and down all this morning without meeting with any prize." Whitney, upon this, wished him better luck and took his leave, really supposing him to be what he pretended. It was only by chance that Whitney happened to be staying at the same lodgings and he heard the gentleman telling a rapt audience how he had deceived a highwayman by his clever stratagem. So the next morning, our impostor set out, with Whitney following about a quarter of an hour later and he relieved the man of his money as revenge for his duplicity. Whitney, like a great many others of the same profession, always affected to appear generous and noble but was still just a highwayman. Eventually he was apprehended in Whitefriars in London and on the 19th of December, 1694, Whitney was taken to the place of execution, near Smithfield Market where he was hanged, aged thirty-four years. And finally, Dick Turpin (1705-1739) a romanticized highwayman best known for a fictional 200-mile (320 km)

James Whitney of Stevenage started life as a butcher until necessitous circumstances came on him apace, and he gave himself up to villainy. When Whitney was a confirmed highwayman he one day met a gentleman on Bagshot Heath, whom he commanded to stand and deliver. To which the gentleman replied: "Sir, 'tis well you spoke first, for I was just going to say the same thing to you." "Why, are you a gentleman thief then?" quoth Whitney. "Yes," said the stranger; but I have had very bad success to-day; for I have been riding up and down all this morning without meeting with any prize." Whitney, upon this, wished him better luck and took his leave, really supposing him to be what he pretended. It was only by chance that Whitney happened to be staying at the same lodgings and he heard the gentleman telling a rapt audience how he had deceived a highwayman by his clever stratagem. So the next morning, our impostor set out, with Whitney following about a quarter of an hour later and he relieved the man of his money as revenge for his duplicity. Whitney, like a great many others of the same profession, always affected to appear generous and noble but was still just a highwayman. Eventually he was apprehended in Whitefriars in London and on the 19th of December, 1694, Whitney was taken to the place of execution, near Smithfield Market where he was hanged, aged thirty-four years. And finally, Dick Turpin (1705-1739) a romanticized highwayman best known for a fictional 200-mile (320 km)

Guest Editorial from Our English Colleague

Stephen Mortlock, DSc, MSc, Quest Diagnostics, London, England

The earliest settlements in Bagshot, England were originally thought to be late Saxon, and the name Bagshot probably derives from BACGA (or Baga or Bacca), either a personal name, that of a tribe, or of a small wild animal (badger or fox). The second part (shot) is thought to be either an angle, corner or strip of land; or that it means "the tribe of". Recent excavation, however has shown that there was both pre-Roman and Roman occupation of Bagshot. There were late Bronze Age settlements in the area, and iron smelting appears to have been a major 'industry' in the locality.

It was, however, in Elizabethan times (late 16th century) that the village of Bagshot prospered due to its position on the main London to the West Country route (The Great South West Road). As with many villages on main coaching routes, Bagshot developed services and stables to provide the coaches with fresh horses, and inns for the thousands of stagecoach passengers who passed through each year. Of these, only 'The Three Mariners' survives in something like its original form, retaining many early features. It was also along the great South West Road that a relay of coaches took the news of the victory and death of Nelson after the battle of Trafalgar in 1805.

The prosperity of the Great South West Road, however, created its share of highwaymen and the demand 'Stand and deliver!' rang out particularly loudly in deserted places like Bagshot Heath. One of the most notorious highwaymen was William Davis (1627-1690), a local farmer who lived near what is known locally as the Jolly Farmer roundabout. Unfortunately, subtlety was not one of his strong points and he aroused suspicion by always paying his debts in gold! He was eventually caught at the White Hart Inn in Bagshot, was hanged at the local assizes and afterwards hung in chains on Bagshot Heath. A public house called the 'The Jolly Farmer' once stood on the roundabout but it is now a golf shop. Claude Duval, the son of a miller from Normandy France, frequented Bagshot heath and it was here, supposedly, that the most famous episode of his career was written about by William Pope in 1670, shortly after his execution. According to Pope, Duval held up a coach with a nobleman and his lady. The lady took out a flageolet (a small woodwind instrument) and played. Duval thereupon took out one of his own and played as well. He commented to the noble that his wife played extremely well, and would, no doubt, dance just as well, and asked her to dance. They danced on the heath and when they were done Duval escorted her back to the coach. There he remarked that her husband had neglected to pay for the music, and stole four hundred pounds from him. Duval was hanged at Tyburn (London) on 21 January 1670, aged just twenty-seven.

James Whitney of Stevenage started life as a butcher until necessitous circumstances came on him apace, and he gave himself up to villainy. When Whitney was a confirmed highwayman he one day met a gentleman on Bagshot Heath, whom he commanded to stand and deliver. To which the gentleman replied: "Sir, 'tis well you spoke first, for I was just going to say the same thing to you." "Why, are you a gentleman thief then?" quoth Whitney. "Yes," said the stranger; but I have had very bad success to-day; for I have been riding up and down all this morning without meeting with any prize." Whitney, upon this, wished him better luck and took his leave, really supposing him to be what he pretended. It was only by chance that Whitney happened to be staying at the same lodgings and he heard the gentleman telling a rapt audience how he had deceived a highwayman by his clever stratagem. So the next morning, our impostor set out, with Whitney following about a quarter of an hour later and he relieved the man of his money as revenge for his duplicity. Whitney, like a great many others of the same profession, always affected to appear generous and noble but was still just a highwayman. Eventually he was apprehended in Whitefriars in London and on the 19th of December, 1694, Whitney was taken to the place of execution, near Smithfield Market where he was hanged, aged thirty-four years. And finally, Dick Turpin (1705-1739) a romanticized highwayman best known for a fictional 200-mile (320 km)
overnight ride from London to York on his horse Black Bess is said to have frequented both the Three Mariners and The Jolly Farmer public houses in Bagshot. It is therefore hardly surprising that Alfred Noyes the poet wrote his poem 'The Highwayman' in a cottage in Bagshot where he had taken rooms. He described Bagshot heath as 'a wild bit of country, all heather and pinewoods' and the poem suggested itself to him one blustery night when the sound of the wind in the pines gave him the first line.

And still of a winter's night, they say, when the wind is in the trees,
When the moon is a ghostly galleon tossed upon cloudy seas,
When the road is a ribbon of moonlight over the purple moor,
A highwayman comes riding—
Riding—riding—
A highwayman comes riding, up to the old inn-door.

Over the cobbles he clatters and clangs in the dark inn-yard;
He taps with his whip on the shutters, but all is locked and barred;
He whistles a tune to the window, and who should be waiting there
But the landlord's black-eyed daughter,
Bess, the landlord's daughter,
Plaiting a dark red love-knot into her long black hair.

Alfred Noyes (1880-1958)