

University of Colorado at Colorado Springs  
Beth-El College of Nursing and Health Sciences  
Forensic Health Science Programs

Careers in Forensic Health Sciences

Nowadays, thanks to television, I have many students seeking to be a "CSI" (crime scene investigator). Unfortunately, what those actors purport to do on the TV program is engage in the wider field of criminal investigation, rather than solely being employed as scene investigators or technicians. Interestingly enough, about 30 years ago, I was involved in some discussions about creating a position called "crime scene technician" because these positions would be less costly, possibly provide better service (through repetitive, specialized work), and would "free up" investigators to concentrate on pursuing investigative leads. The investigators involved in these discussions (there were three large municipal police departments involved and several federal agencies) welcomed the idea because they considered the crime scene search part of the job as dirty and distasteful and they'd rather get on with the more exciting part of the case, such as interviews, interrogations, running leads, interpreting and comparing laboratory results, etc. My, how things seem to have changed. Now folks are beating down the doors to be "CSI's."

The downsides to the CSI business come at the aspiring candidate from both of the only two directions that a person may approach this work. Since crime scene investigation is largely a public government activity at the municipal or county level squarely within the realm of the police (or sheriff), then one must be employed by those agencies if one hopes to do this work. That leaves two approaches - "sworn" or "unsworn." The downside to "sworn" is that one does not simply become an investigator for these type of departments when one walks in the door, but must put in considerable time as a police officer, or in the case of county sheriff departments, possibly a jailer, then patrol officer, and then after that POSSIBLY an investigator. Many folks have expressed no desire to do this (although I regard my days as a police officer as very rewarding). Moreover, all of this is very "iffy" anyway, as one may never be assigned as an investigator in such situations. The downside to "unsworn" is that even though a person may be engaged soon or immediately as a crime scene technician with some amount of training, the career path is most often a dead end street. In a large department, perhaps one can be promoted to a senior or chief crime scene technician, but that is about it. The pay for these unsworn positions is invariably lower than for sworn officers and does not get much better over time. The path for advancement in police departments reside with the sworn positions. I have heard many people say to me that they only want to do this job and do not care about promotions, but that gets a little old seven or ten years down the pike when someone is stuck in that inescapable rut.

Of course, there are federal and state investigative positions, but most of these are specialized and do not deal with crime scenes. Exceptions do exist, such as the Naval Criminal Investigative Service, but they are few and far between.

One other thing I have experienced when dealing with folks aspiring to be investigators, and that is that many limit themselves geographically, stating that they are unwilling to travel to where the jobs are. Of course, the more one limits oneself geographically, the less employment opportunity in a desired field there will be.

So what can I do?

First of all, do not look at your college degree, any college degree, to automatically usher you into a well-paying job that you will enjoy (a tricky combination at best). Try to decide exactly what it is you wish to do as an occupation, and then tailor your studies around that goal. A degree in Forensic Health Sciences prepares you for many positions, but is not an entitlement to a particular job. This is true with any college degree. For example, general liberal arts college degrees such as English and History may prepare you to teach these subjects at the secondary school level or be a reporter for a newspaper, but they are no guarantee of employment. More technical degrees such as the BSN (nursing) or the BSEE or BSME

(electrical or mechanical engineering) greatly assist in preparation for professional licensing examinations, but do not guarantee employment. Within the health sciences, it is no different. A degree in health sciences administration will not net a job as a hospital department director, but rather an entry position as a benefits counselor or personnel specialist. Only with time, dedication, and hard work will one rise to the positions to which one aspires.

This is the same with Forensic Health Sciences, with one rather insidious exception. Unfortunately, the media (mainly prime time television and motion pictures) has latched onto forensic science as a favorite revenue source. Could you imagine a TV program entitled "HCA" (Health Care Administrator) where the hero(ine) reaches into her in box and spends an hour of TV prime time battling red tape and bureaucracy to get low cost care for a single mom and her little kid. Naw, as our gangster friends would say, "fergeddaboutit." To further complicate matters, media portrayal of "forensic" people are largely inaccurate. They perform impossible feats, "do" ridiculous "science," and lead exciting lives quite far afield from their generally assigned duties. It is frustrating for faculty and academic advisors to have to break the news to students that these jobs do not exist. It is tantamount to waltzing in the door declaring "I want to be a Charlie's Angel!"

The Forensic Health Science degree is a challenging, fascinating program of studies that, generally, prepares the student to be an investigator of events that may or will find their way into a court of law. These positions include, but are not limited to serving as a criminal investigator, medical examiner's investigator, coroner or deputy coroner, insurance claims investigator, legal investigator (law firm, prosecutor, or court), or benefits claims investigator.

#### A panoply of forensic science careers

Some students enter college with a preconceived notion of wishing to enter a particular field without knowing what academic preparation is required. What follows is a list of occupations in the forensic sciences, their usual academic preparation, and, a summary statement about the profession:

1. Animal sciences: Forensic science practitioners involved with animal sciences are generally highly specialized concerning a particular species of animal or may be employed in another area of forensic sciences but specialize in animals or animal products. Educational background also varies from baccalaureates to doctorates in chemistry, biology, or veterinary medicine. The range of activity of these scientists is wide, from the cayman/crocodile endangered species DNA database at the Bronx Zoo to the recent investigation concerning counterfeit Russian caviar conducted at the US Fish and Wildlife laboratory in Oregon.

2. Anthropology: Forensic anthropologists identify (or help to identify) individuals by their bones. Common identifications include gender, age, race, distinguishing marks and characteristics, the presence of disease or injury, cultural effects and artifacts, and age of the remains. They typically hold the Ph.D. degree in anthropology and are frequently associated with the faculties of educational institutions.\*\*

3. Art: Forensic artists generally work with two or three dimensional media and endeavor to create images for the identification of suspects (two-dimensional) from eyewitness accounts or victims (three-dimensional) by reconstruction of facial features from skeletal remains. Academic preparation is usually a minimum of the baccalaureate in fine arts or master in fine arts degree.

4. Botany: Forensic botanists study plants and their relationship to crime scenes, frequently in examining plant growth and maturity in relationship to a decomposed body to ascertain an estimate of the time of death. They may also examine the effects of poisonous plants in conjunction with toxicologists and physicians. The common academic preparation is the Ph.D. degree in botany.\*\*

5. Chemistry: Forensic chemists use chemical processes, such as reagents or thin-layer chromatography and instrumental analysis to identify substances. Their main work involves the identification of drugs. Forensic chemists make up the largest number of individuals identified as "criminalists" and generally work in public crime laboratories. The basic degree for this field is the

bachelor's degree in chemistry.

6. Communications: Forensic communications specialists focus upon the spoken word in the analysis of identifying individual speakers based upon speech patterns. They often work with taped recordings and engage in enhancing taped recordings so as to make them more readily identifiable. The academic preparation for this field is generally the Ph.D. degree, which is offered presently at only three institutions worldwide (one of which is the University of Florida).

7. Criminology: Criminologists explore the rationale behind criminal behavior generally at the societal level and involves research and evaluation of the making of laws, the breaking of laws, and the criminal justice system, a portion of which is the enterprise of forensic science. Typically, the practitioner in this area has a Ph.D. in criminology or sociology with an emphasis in criminology.

8. Criminalistics: Generally, the term "criminalistics" is associated with crime laboratory examiners that employ chemistry and/or instrumental analysis in the examination of physical evidence. The term "criminalistics" is rather broad and vague and may include virtually any laboratory examiner. However, the term is most closely affiliated with those laboratory examiners involved with chemistry. Identification of drugs is their main area. Generally, the educational requirement for a criminalist is a baccalaureate in chemistry, occasionally biology.

9. Documents: Questioned document examiners endeavor to identify the handwriting/handprinting of a particular individual by comparing a subject writing with known standards or exemplars. They also examine typewriting, printers, paper, watermarks, torn documents, damaged documents, and may even identify pen inks through thin-layer chromatography. Since this field employs so few individuals, formal educational programs are rare and are usually confined to curricula within crime laboratories in the general form of an apprenticeship. In the past, many very qualified documents did not possess college degrees. Today, the minimum degree for this field is usually the baccalaureate.\*

10. Engineering: Forensic engineers study the mechanisms and effects of mechanical failures, explosions, electrical events, and the like. Their work ranges from faulty construction to stress and age disintegration to the mechanics of vehicular collisions. Academic preparation, as a minimum, includes the bachelor of science in electrical engineering or mechanical engineering and frequently such practitioners possess the MSEE, MSME, or a PhD in these fields. They are also usually registered professional engineers (PE).

11. Entomology: Forensic entomologists study insects and their relation to crime scenes. Most typically, the forensic entomologist will examine carrion insects to determine the time of death of an infested body by factoring in locale, weather, season, environment and stages of insect growth. The usual preparation for this field is the Ph.D. degree in entomology.\*\*

12. Field investigator. Since virtually all forensic scientists are "investigators," we title this occupation "field investigator" to identify those investigators that conduct investigations outside of the laboratory environment (hence, "in the field") and may be general investigators that may investigate criminal or equity matters and search scenes, recover, preserve and transmit evidence, interview suspects, victims, and witnesses, conduct follow-up investigations, and pursue undeveloped leads for other investigators. Field investigators may also specialize in certain types of investigations, such as crimes of violence or fraud investigations. The academic preparation for the field may range from high school to the master's degree level. It is common for many such investigators to possess associate or baccalaureate degrees. A baccalaureate degree in forensic health sciences is an excellent preparation for this area.\*

13. Firearms and toolmarks: Firearm and toolmark examiners seek to identify individual firearms and tools by marks left on the surfaces of projectiles, cartridges, and other objects such as padlocks, windows and doors, and safes. They also engage in serial number restoration. Their main instrument is the comparison microscope. Educational qualifications: See "Documents," above.\*

14. Geology: Forensic geologists work with earth elements to identify rocks and soils in connection with legal matters. They may also work with legal matters concerning erosion or other water or elemental issues of interest. Forensic geologists generally possess the Ph.D. degree.\*\*

Naw. “Graphology:” The study of determining personality from handwriting, called “graphology,” is not considered a legitimate scientific pursuit.

15. Interviewer: Forensic scientists specializing in interview techniques undergo specialized training in a variety of fields to aid them in their pursuit of the truth from interviewees. Many of these specialists are polygraph examiners, where the polygraph instrument is used as an interviewing aid. The preparation for this field is generally the baccalaureate degree, often in psychology, but forensic health sciences is also a viable option.\*

16. Jurisprudence: Jurisprudence specialists are attorneys specializing in the introduction of new forensic evidence into the courts, and the evaluation of that evidence. They also monitor the appellate process. The academic preparation for this field is the J.D. or LL.B. degree.

17. Microscopy: Forensic microscopists specialize in the use of various microscopes, including the scanning electron microscope, to examine, identify, and possibly match trace evidence. They are frequently employed in the identification of painted surfaces or gunshot residue. The educational qualifications usually include a baccalaureate degree in a science such as biology or chemistry.

18. Nursing: Forensic nurses combine traditional nursing expertise (health care, caring and therapeutics) with issues involved with the law. Forensic nurses serve as medical examiner’s investigators, coroners, legal nurse consultants, nurse attorneys, sexual assault nurse examiners, correctional nurse specialists, psychosocial/psychiatric nurses, and specialists in child abuse, spouse abuse, and elder abuse. The educational qualifications is generally registered nurse (R.N.) licensure, but many forensic nurses hold B.S.N., M.S.N., and doctoral nursing degrees.

19. Odontology: Forensic odontologists are dentists that serve to identify individuals by their dentition and also practice in the relatively new field of bite mark identification and analysis. Their academic preparation is the D.M.D. or D.D.S. degree.\*\*

20. Pathology: Forensic pathologists are physicians (M.D. degree) trained in pathology and the subfield of forensic pathology. They specialize in determining the cause and manner of death in humans through the medico-legal autopsy. They are often employed as medical examiners or coroners, or may be employed by coroners.

21. Photography: Forensic photographers generally assist other crime laboratory divisions in applying specific photographic expertise to the photography of evidence and in the preparation of court exhibits. Although good crime scene photography is generally expected of a competent field investigator, professional laboratory photographers may occasionally be called to the scene of a major crime. Educational qualifications: See “Documents,” above.\*

22. Print examination: Print examiners attempt to identify individuals and objects by the prints made by fingers, hands, feet, ears, lips, shoes, and tires, among other things. They compare latent (invisible), plastic, and contaminated prints, and develop latent prints so they can be viewed. Educational qualifications: See “Documents,” above.\*

23. Psychiatry and Behavioral science: This field explores the rationale behind criminal behavior generally at the individual level and involves evaluation of suspected offenders concerning dangerousness, motivation, and sanity, as well as recommended treatment. Generally, forensic psychiatrists are physicians (M.D. degree) and forensic psychologists are clinical psychologists with the Ph.D. degree.

24. Radiology: Forensic radiologists examine radiographs and interpret injuries to tissue

detectable by radiologic means, including bone breakage and projectiles in bodies. the field is especially known for the discovery of certain bone fractures connected to child abuse. The M.D. degree and a specialty in radiology is required in this field.\*\*

25. Serology: Forensic serologists, which are often also included under the broader title “criminalist,” use chemical and instrumental means to identify blood, other body fluids, and tissue. They are also employed in deoxyribonucleic acid (DNA) examination. Academic preparation in this field usually includes the minimum of a baccalaureate degree in chemistry or biology.

26. Toxicology: Forensic toxicologists usually hold a Ph.D. in toxicology and their area of expertise is the study of poisons and the level of toxins required to impair or kill a human, and occasionally other animals or plants. They are often employed by large medical examiner’s offices.

\*Denotes a field where a forensic health science baccalaureate degree is appropriate.

\*\*Denotes a field that has relatively few full time positions and is almost always pursued as a part time activity.