PROBABILITY OF ARCHIVES MISSING FROM 4 SEPARATE LOCATIONS IN THE ABSENCE OF WRONG DOING:

ANALYSIS

As described above, these four archives were maintained in separate locations under distinct independent supervision. Therefore, a file missing in one place should not under normal circumstances have affected a file missing in one of the other archive locations. These unusual events give rise to the question:

> **What is the statistical probability that these four archives for the same case are missing randomly, i.e., in the absence of intentional acts, i.e., wrongdoing?**

The mathematical science of Statistics uses the word "probability" to convey the meaning of likelihood or the percentage chance or prospect of something occurring.

Using basic probability principles, the likelihood of these four archives disappearing randomly is EXTREMELY SMALL.

First we discuss what probability (likelihood) is. Then we describe statistically independent events.

Probability (P) ranges from 0 to 1.0 (0 - 100%) and can also be thought of as likelihood. A probability of 0 (zero) means that it's impossible to occur, i.e., it will never happen. A probability of 0.5 or 50% means that it will occur half the time. A probability of 1.0 or 100% means that it's certain to occur or will happen all of the time.

Independent events A and B mean that the occurrence of A, i.e., the outcome of A has no effect on the likelihood (probability) of B and the occurrence of B, i.e., the outcome of B has no effect on the likelihood (probability) of A. In other words, A and B are not causally related.

The probability of both A and B occurring together (A+B) is the probability of A occurring multiplied by the probability of B occurring. This is expressed mathematically as follows:

P = probability
A = first independent event
B = second independent event

$$P(A+B) = P(A) \times P(B)$$

This formula applies for any number of independent events. For four independent events, A, B, C, and D, the probability of these four independent events all occurring simultaneously would then be expressed mathematically as follows:

$$P(A+B+C+D) = P(A) \times P(B) \times P(C) \times P(D)$$

This case involves four independent events within the framework of one criminal case. Where the loss of records (from this one case) in four separate locations occur, the question is how to statistically quantify all four of these archives disappearing by a random event. This would be stated as:

$$A+B+C+D$$

This would be defined as follows:

A = event that the records are missing in the Police Detective Division
B = event that the records are missing in the Mobile Crime Scene Unit
C = event that the records are missing in the Photo Lab
D = event that the records are missing in the Coroner's Office

As stated above, these four archives were kept and maintained in four separate locations, each under independent supervision. Therefore, a file missing in one place should not under normal circumstances, affect a file missing in one of the other places.

The next question is what is the likelihood or probability that one of these files comes up missing in a given location under a random event?

Generally, records in law enforcement agencies do not regularly disappear. Naturally, to get the exact probability for this situation, one would need the exact probability or frequency that records disappear in each specific location. When the City was asked for this information, which again is a matter of public record, they refused to provide it. The City's refusal to provide this information has not been factored into this analysis.

According to the letter provided by Dr. Wecht, the Coroner had two out of 65,000 cases files turn up missing.

Using common sense and everyday observation, it is safe to assume that it is a rare occurrence that important records turn up missing. Any record maintained in a given location is very unlikely to **disappear without explanation, i.e., sloppy record keeping, equipment failure, human error, natural disaster, or any other administrative negligence**.

To give the Commonwealth the benefit of the doubt, we start by hypothetically assuming that the records will commonly disappear as a random event for five percent of cases. The probability of disappearance at a single location would be 0.05 (5%) and the

probability of all 4 files disappearing in the absence of wrong doing (randomly) would be 1 in 160,000 (0.05 x 0.05 x 0.05 x 0.05).

If records are assumed to have disappeared at a single location in 1% of cases, then the probability of loss at 4 distinct locations would be

$$P(A+B+C+D) = 0.01^4 = 0.01 \times 0.01 \times 0.01 \times 0.01 = 0.00000001 = 10^{-8} = 1/10^8$$

This is 1 in 100,000,000 or one in 100 million.

Recall that this is based on assumptions giving the Commonwealth the benefit of the doubt, i.e., that records disappear in 1% of cases for each location.

Realistically, these frequencies would be expected to be lower, more like 1 in 1,000 (0.1%) or even less at each location. For a frequency of disappearance of 1 case out of 1,000 at all 4 locations, then:

$$P(A) = P(B) = P(C) = P(D) = 0.001$$

and the actual probability of the archives missing in all four locations as a random event or in the absence of wrong doing would be **one in a trillion** (0.001^4).

These probabilities are included in the following table showing the statistical probability of missing records as random events for the range of probability of disappearance of archives at an individual location for the following range of values: 0.1 to 10%.

% Of Cases	1 Archive	2 Archives	3 Archives	4 Archives
0.1%	1 in 1,000	1 in 1,000,000	1 in 1,000,000,000	1 in 1 Trillion
0.2%	1 in 500	1 in 250,000	1 in 125,000,000	1 in 62,500,000,000
0.5%	1 in 200	1 in 40,000	1 in 8,000,000	1 in 1,600,000,000
1%	1 in 100	1 in 10,000	1 in 1,000,000	1 in 100,000,000
2%	1 in 50	1 in 2,500	1 in 125,000	1 in 6,250,000
3%	1 in 33	1 in 1,111	1 in 37,037	1 in 1,234,568
4%	1 in 25	1 in 625	1 in 15,625	1 in 390,625
5%	1 in 20	1 in 400	1 in 8,000	1 in 160,000
6%	1 in 17	1 in 278	1 in 4,630	1 in 77,160
7%	1 in 14	1 in 204	1 in 2,915	1 in 41,649
8%	1 in 12 ½	1 in 156	1 in 1,953	1 in 24,414
9%	1 in 11	1 in 123	1 in 1,372	1 in 15,242
10%	1 in 10	1 in 100	1 in 1,000	1 in 10,000

Once the archive disappears in the second location for the same case, then the probability of the 2 disappearances independently being random goes down

exponentially. All the more so on the 3rd and 4th record coming up missing. Please look to the above table.

It is also important to note that the specific probability of a record disappearing is not necessarily going to be the same in each location. As noted earlier in this analysis, this information is not available as a result of the City's refusal to provide it. However, an example of the probability of all 4 archives being missing using different location-specific probabilities is now presented.

A = event that the records are missing in the Police Detective Division
B = event that the records are missing in the Mobile Crime Scene Unit
C = event that the records are missing in the Photo Lab
D = event that the records are missing in the Coroner's Office

If the probability of the record disappearing from the Police Detective Division is 1 in 1,000, then P(A) = 0.001 (0.1%).

If the probability of the record disappearing from the Mobile Crime Scene Unit is 1 in 200, then P(B) = 0.005 (0.5%).

If the probability of the record disappearing from the Photo Lab is 1 in 500, then P(C) = 0.002 (0.2%).

If the probability of the record disappearing from the Coroner's Office is 1 in 1,000, then P(D) = 0.001 (0.1%).

The probability of all four archives randomly missing, i.e., in the absence of an intentional act or wrongdoing would be expressed mathematically as follows:

$$P(A\&B\&C\&D) = P(A) \times P(B) \times P(C) \times P(D) =$$

$$0.001 \times 0.005 \times 0.002 \times 0.001 =$$

$$10^{-11} = 1/10^{11}$$

This probability is 1 in 100 Billion. To get the exact value for this probability, the frequency of disappearance would need to be known at each specific location. As noted above, the City has refused to provide this information. Allegheny County Office of the Coroner reported that two out of 65,000 cases are missing. The above calculations are more than generous to the Commonwealth. Where in fact the number of missing records from the Coroner's Office is just under one in 30,000, one in 1,000 was used. The above conservative assumptions give the Commonwealth far more than the benefit of the doubt.

In DNA testing, the probability of a correct match is usually stated in much lower numbers by comparison. In some cases, one in 40 million has been considered a correct match. These numbers are considered to be reliable positive identification of a match. It

therefore stands to reason that there is a positive identification of intentional act, i.e., wrongdoing in the unexplained disappearance of all four of these archives in the case of the death of George Wilhelm.

These low probabilities coupled with the numerous problems enumerated in the accompanying Chronology of Questionable Events and Decisions, such as the circumstances by which the archive disappeared from the Coroner's Office, the unexplained absence of a picture of the blood spatter, and the failure to determine the material under the victim's fingernails leads to the following conclusion:

The assertion of the District Attorney's Office that this is nothing more than a random coincidence in the face of the above set of facts is unrealistic! The most likely cause of the disappearance of all of the above records is an intentional act, i.e., wrong-doing.

In most cases where wrong doing or criminal activity is established, there is a motive. While there are various possibilities to explain motive, the most likely reason for the destruction of police records is to cover up or mask something that happened during the course of the investigation and prosecution of the given case.

TEXTBOOK REFERENCES:

1. Probability and Statistics by Julius R. Blum and Judah I. Rosenblatt. W.B. Saunders Company, 1972.

Page 85-86 for independent events and page 10 at the bottom for probability ranging from 0 to 1.

2. Statistics for Mangement and Economics (4th Edition) by Collin J. Watson, Patrick Billingsley, D. James Croft and David V. Huntsberger. Allyn and Bacon Publishing, 1990.

Pages 125-145 cover all the properties of probability including independent events.

3. Fundamentals of Management Science (5th Edition) by Efraim Turban and Jack R. Meredith. Irwin Publishing, 1991

Pages 981-985 cover all the properties of probability including independent events.