norah rudin & keith inman • the proceedings of lunch

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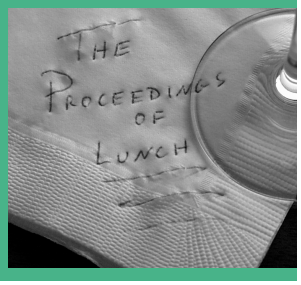

The Shifty Paradigm, Part II

Errors and Lies and Fraud, Oh My!

Getting Breakfast

We concluded our previous column with the realization that we had bitten off too much to chew for one article. Speaking of chewing, Jack (there must be a Jack behind Jack's Bistro) is beginning to feel like an old friend. Unable to schedule a midday meeting, we opt for the early morning and find that, indeed, Jack's breakfast offerings reward our efforts. If he only knew.

As we indulge in our omelets, we review both the article that prompted these two columns, *The Coming Paradigm Shift in Forensic Identification Scienc*e (Saks and Koehler, 2005), and our initial response in last quarter's *The CACNews*. (Rudin and Inman, 2005) We realize that many of Saks and Koehler's assertions are based on a chart of relative error rates that they include as Figure 1 of their paper. We reproduce the figures resulting from their data analysis in Figure 1 of this commentary. The chart is reportedly based on analysis by Saks and Koehler of case data provided by the Innocence Project. Because there was a press release associated with the publication of the Science paper, these figures have now been propagated through the media as fact. And because they also form the core of the assertions made by the authors, it is worth looking at the underlying assumptions and data analysis methods. Data analysis methods you say? What data analysis methods? We'll get to that. In typical Keith and Norah fashion, we first examine the ever-important ASSUMPTIONS.

The Hidden Stuff

The overwhelming in-your-face assumption here is that both the total and relative proportion of "factors" associated with DNA exoneration cases are 1) factual and unassailable and 2) representative of all criminal cases. Tackling the latter assumption first, we note that cases selected for review by the innocence project have already undergone a highly selective screening process. According to the Innocence Project web site (FAQ, 2005):

> "*The Innocence Project provides legal assistance to inmates in cases where DNA testing of evidence can yield conclusive proof of innocence. Cases must involve biological evidence, e.g. spermatozoa, blood, saliva, skin, hair. All cases for consideration should be mailed with the following information: a brief factual summary of the case, and a list of the evidence used against the defendant. Do not send any documents until you receive a written request to do so. We do not accept cases where DNA testing has already been performed with conclusive results, nor can we provide general legal advice or research*"

The most obvious point is that this case set does not even include cases for which biological evidence was never collected or is not relevant. That excludes all cases where non-biological evidence was at issue and also all cases where physical evidence played no part in the case. Second, cases for which conclusive DNA testing has already been performed are not included. We don't attempt to determine here exactly how the selection criteria might skew the data, but at the very least, an entire class of data is missing in which physical evidence played no part. Therefore all errors in that set of data are also not represented. While interesting from the point of view of the Innocence Project, this data set clearly does not fairly or adequately represent all cases involving forensic science. The problem is that the reader is left to implicitly assume that it does.

Analyzing the Analysis

In reacting to the comments based on the chart, it is easy to forget that the conclusions in the chart are not factual, but represent only Saks and Koehler's interpretation of some data. Where is the materials and methods section, we wonder? What parameters have they chosen for their analysis? What are the confidence limits on their calculations? For example, 6 of the 9 categories span percentages from 17% to 28%. Are these really different or within statistical error based on the sample size? Has the analysis been peer-reviewed to see if other qualified individuals agree that the data support the conclusions? Like all data, conclusions from it depend on interpretation parameters and judgment calls. Because it was submitted as a review, this paper was not peer-reviewed for publication, so no independent verification exists for Saks and Koehler's methods. Said another way, no one else has confirmed that the data supports their conclusions.

However, we do have at least one other analysis of the same data to which we can compare it. A similar chart is found on the Innocence Project web site itself (Causes, 2005). Similar, but not the same. We find the differences interesting (Figure 1). The chart on the Innocence Project web site reflects 70 cases and the chart in the Saks and Koehler paper reflects 86 cases. However, that does not account for the different characterization of "factors." The Innocence Project appropriately separates serology inclusions that were, in all likelihood, correct, but insufficiently discriminating, as well as hair comparison, which suffers from a combination of poor discrimination and lack of objective standards. Significantly, blatantly defective or fraudulent science merits a separate category. It appears that Saks and Koehler have combined some or all forensic testing results that resulted in apparent false convictions into one category, forensic science testing errors. They do not do themselves or their cause any favors by this heavy-handed rearrangement of the data. DNA typing is better at discriminating between individuals than was conventional serology. No one disputes that, nor its utility in obtaining post-conviction relief for the wrongly convicted. However to include a properly conducted test with

certain inherent limits in the same group as blatant errors or fraud would appear to deliberately misrepresent the data. We have to stop and ask ourselves—could this be an error?

We also can't help but note that Sacks and Koehler misquote their own chart: "What was unexpected is that erroneous forensic science expert testimony is the second most common contributing factor to wrongful convictions." (Saks and Koehler, 2005; pg. 893, 1st column) According to their own chart, testimony should be only the 5th most common factor. Would they categorize their own performance as an error? Why was it not caught and corrected during what must have been numerous edits and reviews? We were also intrigued by their quote: "All [forensic science] experts are tempted, many times in their careers, to report positive results when their inquiries come up inconclusive, or indeed, to report a negative result as positive." This quote is attributed to an article by Andre Moenssens (Moenssens, 1993). A quick check with Dr. Moenssens revealed that the author of the quote was actually the late Fred Zain. (Moenssens, 2005) To include such a quote out of context, without revealing its infamous author, seems to us, at best, disingenuous.

How do we QC an eyewitness, a jailhouse snitch, or a confession? The determination of human "errors" depends on the believability and credibility of other humans.

To err is human, to forgive is… apparently not an option

A main point in the paper is that "forensic science testing errors" and "false / misleading testimony by forensic scientists" comprise a major proportion of wrongful convictions. We must ask ourselves, how many forensic science "errors" (agreeing, for the purpose of this discussion to define error as an apparent wrongful conviction) have been exposed precisely because definitive tests *can* be performed to expose the errors. The remaining causes of wrongful convictions all relate to human frailties that are much less amenable to formal and definitive testing. How can we quantify prosecutorial misconduct, defense counsel incompetence, or police misconduct? What test reliably distinguishes dishonest informants, false confessions, and false testimony by lay witnesses from truthful ones? Or, to make a direct analogy, how do we QC an eyewitness, a jailhouse snitch, or a confession? The determination of human "errors" depends on the believability and credibility of other humans. While an overwhelming amount of contrary information might convince most of us that an informant lied, no definitive test exists. So, even defining an "error" as an apparently wrongful conviction, the proportion estimates for causes that do not relate to physical evidence must have wider confidence limits, however difficult they may be to measure. Saks and Koehler treat all the data as if it had equal reliability.

Although we have no easy answers, we feel compelled to at least address the contentious subject of error rates. We continue to argue that there is no such animal as an error "rate." Inclusion of this wording in a controlling legal decision by a federal judge does not automatically legitimize it as a relevant quantifier of forensic science. A rate implies a constant for a defined procedure or process, both of which are totally inapplicable to forensic work taken as a whole. And, at the risk of beating a hole in the drum, we feel compelled to note that, like other observers who like to harp on error rates, Saks and Koehler completely sidestep the issue of actually defining an error. While we can deduce an implicit legal definition of a wrongful conviction, this is ultimately not helpful on a scientific level. The disconnect seems to be that the legal profession has attempted to commandeer a perfectly reasonable quantifier of error for a single controlled scientific process, for example fidelity in PCR amplification, and apply it wholesale to a complex human endeavor that includes many different scientific as well as human processes. Even if the oft-suggested solution of blind proficiency testing could be implemented wholesale, trying to predict the rate of *undetected* errors (however those might be defined) from analysis of such data seems to us tenuous at best.

The concept of detected versus undetected errors may be a useful and important distinction that could clarify the discussion. If an error, of whatever type, is detected, by whatever means, then the probability of that error occurring in this particular case is one (100%). There is no need to apply any rate, we know the answer. It is the undetected errors that concern us. This is actually a much thornier problem and one to which no easy answer exists. It forces all of us, the forensic profession, the legal profession, the judicial system, and the public, to acknowledge that undetected errors can, do, and will exist. Such errors are likely sporadic, unpredictable, and sometimes undetectable as well as undetected. What society must understand is that, with or without forensic analyses, the risk of convicting an innocent person will never be zero. Most people appreciate, at some basic level, that human endeavors are fallible. But they have the unrealistic expectation that scientific endeavors carried out by human beings are infallible; the label of science confers the patina of certainty. In reality, what science does is measure uncertainty. Any answer we provide must, by definition, be probabilistic in nature, and be conditioned on various assumptions. If science is involved, the possibility of error always exists. Because our judicial system is predicated on the presumption of innocence, this realization appropriately makes people uncomfortable. But what is the alternative? Clearly, the non-scientific evidence is also at risk for error, the difference being that it is much more difficult to both detect and quantify.

Time to stop whining (and dining)

Although we have spent all of the last, and much of this, article dissecting the Saks and Koehler article, ultimately that solves nothing. And while we disagree with many of their proposed solutions, they also raise a number of valid points. While the many observers of forensic science comment vociferously and frequently, the forensic community is comparatively silent. We must understand that we invite reinvention by leaving a vacuum; if we do not take positive action, the consumers of forensic science will fill the void and define our profession for us. Although input from both the consumers of forensic science and from the academic disciplines from which it is derived should be welcomed, we cannot let others define our practice and our profession. While those on the front and back ends

have much to offer in terms of information and assistance, a failure to understand the issues too often results in asking (and answering) the wrong questions.

One reason, in our opinion, that the observers feel justified in commenting, is that the field is not sufficiently self-critical. Historically, we tend to justify, explain, and rationalize before we agree to make substantive changes. Why is this? Much of the problem lies in the very fact that our job is to defend our work on a daily basis. It is easy to confuse defending our work with defending ourselves. There exists an underlying fear that human fallibility is not an option. This very real fear is fueled in large part by the vociferous and condescending attacks of legal observers, often through the public channel of the media. Sometimes, this unfortunately has been the only way to force a wayward lab to open itself to independent review, providing a justification on which the critics can hang their hats. However, as a general approach, it is not an effective tool to promote openness, transparency, and positive change. An additional factor is that our adversarial system, at least in the US, lends itself to personal attacks. Often it is much easier for an attorney to try to discredit the testifying expert than the evidence itself. It is a sad commentary on both professions when much of the discussion is focused on either perpetrating or defending oneself from attacks, rather than attempting to understand what the evidence is telling us.

We are invited participants in the judicial process; without the lawyers, none of us would have a job. Yet, to best assist the judicial system in analyzing, interpreting, and understanding physical evidence, we must maintain our objectivity, autonomy, and identity; we cannot become simply a pawn of either side of the system. We must insist on defining the questions. However, we must also accept that practicing criminalists are not going to single-handedly solve many of the challenges facing the forensic profession today. We simply do not have the time, monetary resources, academic resources, or, in many cases, adequate education and training. We must actively solicit assistance from and seek partnerships with our clients, those in the legal profession, and from our roots, the academic "feeder" disciplines that form the basis of our applied science. Furthermore, forensic science needs to be an ongoing and formalized academic endeavor, supported with concomitant funding, human resources, and competent direction. If we cannot develop and support our opinions based on science, rather than policy, then those who like to refer to working criminalists as technicians will be entirely justified.

The forensic science paradigm has already shifted. Both the profession and the practice have changed significantly over the last decade, for more reasons than merely the introduction of DNA typing into the forensic lexicon. The question is, will we, as a profession, actively determine the direction of shift as it continues, or will we sit passively while others make those decisions for us.

If anyone is interested in joining the discussion, we're buying …

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Saks, M.J. and Koehler, J.J., The coming paradigm shift in forensic identification science, *Science*, 309, pg. 892, 2005.

Rudin, N. and Inman, K, The shifty paradigm, part I, who gets to define the practice of forensic science, *The CACNews*, 4th Quarter, 2005.

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Moenssens, A. A., *J. Crim. Law Criminol.* 84, 1, 1993.

Dr. Andre Moenssens, personal communication

Figure 1

Saks and Koehler	%
Eyewitness errors	71
Forensic science testing errors	63
Police misconduct	44
Prosecutorial misconduct	28
False/misleading testimony by forensic scientists	27
Dishonest informants	19
Incompetent defense representation	19
False testimony by lay witnesses	17
False confessions	17

Innocence Project	%
Mistaken ID	61
Serology inclusion	40
Police misconduct	38
Prosecutorial misconduct	34
Defective or fraudulent science	26
Informants / snitches	16
Bad lawyering	23
Microscopic hair comparison	21
False witness testimony	17
False confessions	15
Other forensic inclusions	6
DNA inclusions at time of trial	2