International Journal of Intelligence and CounterIntelligence, 18: 707–729, 2005

ISSN: 0885-0607 print/1521-0561 online
DOI: 10.1080/08850600590945434

Routledge
Taylor & Francis Group

STEPHEN MARRIN and JONATHAN D. CLEMENTE

Improving Intelligence Analysis by Looking to the Medical Profession

Intelligence agencies might benefit from assessing existing medical practices for possible use in improving the accuracy of intelligence analysis and its incorporation into policymaking. The processes used by the medical profession to ensure diagnostic accuracy may provide specific models for Intelligence Community use that could improve the accuracy of analytic procedures. The medical profession's way of accumulation, organization, and use of information for purposes of decisionmaking could also provide a model for the national security field to adopt in its quest for more effective means of information transfer. Some limitations to the analogy are inevitable due to intrinsic differences between the fields, but the study of medicine could provide intelligence practitioners with a valuable source of insight into various reforms with the potential to improve the craft of intelligence.

A LITTLE-EXAMINED ANALOGY

The analogy between medical diagnosis and intelligence analysis has been a thin thread running through the intelligence literature. In 1983, historian Walter Laqueur, in ''The Question of Judgment: Intelligence and Medicine,''[1] examined the analogy at a general level. He argued that

Stephen Marrin is a doctoral candidate in the Woodrow Wilson Department of Politics at the University of Virginia, specializing in the study of intelligence. He previously served as an analyst with the Central Intelligence Agency and subsequently with the Congressional Government Accountability Office (GAO). Jonathan D. Clemente, M.D., is a physician in private practice in Charlotte, North Carolina. He is currently writing a scholarly history of the United States medical intelligence program and medical support for clandestine operations from World War II to the present.

medicine is more an art than a science because the process of diagnosis entails the use of judgment as a means to address ambiguous signs and symptoms.[2] Laqueur also highlighted similarities between medicine and intelligence. For example, in citing advances in medical technology he said it was ''precisely because of such progress [that] the similarity in concept between medicine and intelligence ... has become more obvious.''[3] He noted that ''the similarities extend to both collection and analysis, or in the case of medicine, diagnosis.''[4] In addition, Laqueur emphasized similarities in analytic processes, pointing out that ''the student of intelligence will profit more from contemplating the principles of medical diagnosis than immersing himself in any other field. The doctor and the analyst have to collect and evaluate the evidence about phenomena frequently not amenable to direct observation. This is done on the basis of indications, signs, and symptoms. . . . The same approach applies to intelligence.''[5]

Many aspects of intelligence practice can be found in medicine, including a parallel to the steps in the intelligence cycle. Just as in intelligence, medical practice includes tasking, collection, analysis, and dissemination. Consider the case where a patient presents a ''chief complaint'' and asks the physician to come up with a diagnosis and appropriate course of treatment. The physician assembles bits of raw information about the ''history of present illness,'' analyzes the data to come up with both a reasonable differential diagnosis and a presumptive diagnosis, and provides a course of treatment and prognosis to the patient. The cycle repeats itself as better information becomes available, new questions arise, and the diagnosis and definitive treatment are refined.

Unfortunately, Laqueur's observations have not been explored at length in over two decades. No other articles have been published on the analogy between intelligence and medicine, and no books have addressed it at length. This failure by both practitioners and students of intelligence to explore the ramifications of an analogous profession is indicative of the conceptual insularity of the intelligence discipline writ large. Security concerns constrain the intelligence community's ability to reach out to external sources for ideas and insight, and, as a result, the internal discussions that occur in intelligence circles regarding ways to improve existing practices—the same kinds of discussions that occur in every field—are stultified because of the limited number of ideas that can proceed through the narrow chokepoints to the outside world.

SIMILARITIES BETWEEN ANALYSIS AND DIAGNOSIS

The similarities between intelligence analysis and medical diagnosis are obvious at first glance, with intelligence producing analysis and estimates regarding events in foreign countries and medicine producing diagnoses

and prognoses regarding the health of individuals.[6] In both intelligence and medicine, the practitioner uses similar approaches and technology to gather data, integrates this data into an assessment of what is going on today patterned on existing understandings of causal relationships, and then interprets the importance of the situation and forecasts what might happen in the future in terms useful for decisionmaking. In addition, both intelligence analysis and medical diagnosis are vulnerable to similar causes of inaccuracy in their respective assessments.

Parallels in Collection

Both medical and intelligence practitioners apply the same general approaches and similar technologies to acquire information. Medical diagnosis and patient health assessment follow a fairly standard algorithm taught to every second-year medical student and in use since the days of the great diagnostician Sir William Osler. Each step within this algorithm has a specific parallel to the processes used to collect intelligence.

The diagnostic process begins with the elicitation of the ''history of present illness,'' where the patient relates the characteristics of the specific complaint and other subjective qualitative and quantitative features to a physician. The physician then ascertains any relevant past medical or surgical history, medication use, and known allergies. In the intelligence profession, this might be roughly equivalent to the acquisition of ''basic intelligence''—i.e., knowledge regarding foreign countries or groups for operational planning at any level[7]—in order to determine the potential significance of any recent changes. While the patient interview is a good information source for diagnosing a patient, as in the human intelligence process, self-reporting by patients can be notoriously unreliable, for any of a number of reasons. As a result, medical schools train physicians to acquire information from the patient via what intelligence practitioners might consider an approximation of human intelligence (HUMINT) elicitation techniques including use of body language to ''enhance rapport and reinforce continuity of conversation,'' appropriate uses of closed and open questioning, minimization of jargon, and the use of positive reinforcement and silence as ways to control the interview.[8] The intelligence community's equivalent to the ''patient interview'' might be a State Department or military attaché report of a conversation with a foreign official, or perhaps, a defector or refugee debriefing.

The second step in the medical diagnostic process is the ''review of systems.'' At this stage, the physician literally performs an objective head-to-toe assessment of specific organ systems, such as the cardiovascular and gastrointestinal systems, in order to determine whether any specific signs or symptoms of disease are present. The penultimate step is the ''physical

examination'' of the patient, beginning with a measurement of the acknowledged vital signs: temperature, blood pressure, pulse, heart and respiratory rate. This hands-on assessment of the patient—checking for swollen lymph nodes, listening to the heart, feeling the belly, checking the reflexes—is the true art of medicine. In the intelligence field, these hands-on checks do not have a direct equivalent for analysts, other than perhaps overseas familiarization tours made to gain first-hand knowledge of the country they are responsible for. A second-hand version of the physical exam might also be intelligence cables from State Department officers or military attachés, reporting on what they saw during their travels in foreign countries.

Finally, if additional information is required, physicians then order laboratory tests. Some tests, such as X-rays or magnetic resonance imaging (MRI), are equivalent to imagery intelligence (IMINT),[9] while other tests such as those that measure blood products or other bodily functions could be considered the rough equivalent of measurement and signatures intelligence (MASINT).

In addition, just as the collection systems are similar in both medicine and intelligence, so is the discussion over the relative utility of the information provided by each system. An active debate exists within the intelligence field over the relative value of various collection systems in divining the capabilities or intentions of international actors. A similar debate occurs in the medical field. According to a popular aphorism taught to generations of medical students, ''90 percent of all diagnoses are made by the clinical history alone, 9 percent by the physical exam, and 1 percent by laboratory tests and imaging studies such as CT and MRI scans.'' While the medical profession's use of laboratory tests and medical diagnostic imaging modalities, such as computed tomography (CT) scans and magnetic resonance imaging (MRI), may be increasing, they are not infallible and often do not reveal the definitive diagnosis. Ultimately, just as IMINT cannot provide the same insight into intentions as HUMINT, no CT scan or MRI can replace the physician–patient relationship, the hands-on approach, or the experience of having examined patients before. In both intelligence and medicine, all forms of collection must work in concert for the all-source intelligence analyst or the physician to successfully complete their tasks.

Yet, the collection of information in either the medical or intelligence field does not *ipso facto* lead the practitioner to a conclusion, and an over-emphasis on collection in either field may lead to excessive data collection. According to Richards Heuer, the ''rationale for large technical collection systems'' may be rooted in the misapplication of the so-called ''mosaic theory of intelligence.''[10] This theory states that a ''clear picture of reality'' results from the assemblage of numerous bits of information into a

"mosaic or jigsaw puzzle" and implies that accurate assessments can arise only after accumulating a complete data set. However, as Heuer points out, research into cognitive psychology suggests the opposite. Intelligence analysts may first form a mental picture and then find individual pieces of information—each of which may support independent hypotheses—to support their initial estimate of the situation. The accuracy of these estimates, therefore, may depend on the balance between data collection and "the mental model used in forming the picture." As a result, the analytic and diagnostic processes used in both fields are very important because they help the practitioners create the mental models that Heuer refers to.

Parallels Between Analysis and Diagnosis

Once the various streams of information are collected, the integration process in medicine is very similar to that which occurs in intelligence because practitioners in both fields use approximations of the scientific method—observation, hypothesis, experimentation, and conclusion—as a means to organize and interpret the collected information. Many empirical or data-driven professionals, such as detectives in the law enforcement profession and physicians in the medical profession, use the scientific method as a way to derive causal relationships and test hypotheses. The ultimate goal is to derive an accurate estimate of any given situation.

As has been addressed elsewhere,[11] the intelligence analysis process, though an approximation of the scientific method, does not parallel it exactly because no experiments are possible in the international arena. Yet, most writers who focus on analytic tradecraft—whether they realize it or not—portray the intelligence analysis process as a version of the scientific method. In the end, intelligence analysis entails inductive and deductive reasoning applied in turn to find patterns among data and derive hypotheses that explain what the data mean. Most recommendations for improving intelligence analysis are akin to the lessons taught in graduate-level methodology courses: use good data, prevent bias, test hypotheses through a competitive process, etc. Analysts tend to use intuitive "pattern and trend analysis"—consisting of the identification of repeated behavior over time and increases or decreases in that behavior—to uncover changes in some aspect of international behavior that could have national security implications.[12] They then apply some aspect of disciplinary theory—political science, economics, psychology, military science—informed by their knowledge of the history and culture of the region to derive the implications of the change. This analytic process is very similar to the one physicians use to diagnose their patients.

For the most part, physicians must combine the signs and symptoms into a hypothesis informed by theory—i.e., identified patterns associated with

diseases. The ability to arrive at a correct medical diagnosis goes far beyond merely ordering the appropriate blood tests or X-rays. This clinical skill requires years to master. At its core it requires a solid base of working medical knowledge, involving the interpolation and synthesis of sometimes incongruous facts into a logical diagnosis. Fundamentally, the most effective physicians are good listeners, capable of at once noting the pertinent elements of the patient's complaint, adroit at recognizing nuances in expression, body position, and vocal inflection, and able to use these to discern the true nature of a patient's complaint.

When the analytic processes in medical diagnosis and intelligence analysis are assessed side-by-side, the parallels are striking. According to the Central Intelligence Agency's (CIA) Richards Heuer, medical diagnosis provides a more accurate way of describing how intelligence analysis should work than do other analogies,[13] noting:

> The doctor observes indicators (symptoms) of what is happening, uses his or her specialized knowledge of how the body works to develop hypotheses that might explain these observations, conducts tests to collect additional information to evaluate the hypotheses, then makes a diagnosis. This medical analogy focuses attention on the ability to identify and evaluate all plausible hypotheses. Collection is focused narrowly on information that will help to discriminate the relative probability of alternate hypothesis. To the extent that this medical analogy is the more appropriate guide to understanding the analytical process, there are implications for the allocation of limited intelligence resources. While analysis and collection are both important, the medical analogy attributes more value to analysis and less to collection than the mosaic metaphor.[14]

Even the process of distinguishing the relevant information from the irrelevant—also known as differentiating the signals from the noise—is similar in both professions. The process of arriving at a medical diagnosis requires that the physician first establish a reasonable ''differential diagnosis,'' which often includes two or more diseases that may have similar signs and symptoms. The task of the physician is to systematically compare and contrast the clinical findings to determine the most likely etiology—or cause—of the patient's malady. Similarly, Heuer argues that without considering all alternative hypotheses, an intelligence analyst cannot evaluate the ''diagnosticity of evidence.'' He considers this term to mean ''the extent to which any item of evidence helps the analysts determine the relative likelihood of alternative hypothesis.'' So, for example, Heuer correctly points out that ''a high-temperature reading may have great value in telling a doctor that a patient is sick, but relatively little value in determining which illness a person is suffering from.'' Diagnostic evidence influences one's ''judgment on the *relative* likelihood

of the various hypotheses''; whereas, evidence that ''seems consistent with all the hypotheses'' at least in the case of medicine, does not narrow the differential diagnosis, and ''may have no diagnostic value.''[15]

Technology and Coordination

Technological tools developed to improve the rigor and accuracy of intelligence analysis or medical diagnosis can help analysts and physicians weed through data and discover patterns, but are less able to assist the analysts in interpreting the intelligence and deriving meaning and implications. Both medical diagnosis and intelligence analysis require judgment in interpretation of the evidence that goes above and beyond what can be quantified or automated. The scientific method helps intelligence analysts and physicians form hypotheses regarding the cause of the issue at hand, but in both cases ambiguous information and circumstances require critical thinking and judgment in order to come to conclusions regarding the accuracy of the hypothesis and its implications for—respectively—a nation's interests, or the patient's well-being. An implication stemming from this observation is that the accuracy of the intelligence analysis or diagnosis may rest on the cognitive abilities of the practitioners. ''The key,'' according to Richards Heuer, ''is not a simple ability to recall facts, but the ability to recall patterns that relate facts to each other and to broader concepts—and to employ procedures that facilitate this process.''[16] Yet, just as in intelligence analysis, medical diagnosis is occasionally arrived at serendipitously, as when a physician reads about some obscure disease in a medical textbook or journal the night before a case of this disease is coincidentally seen in his clinical practice.

Complicating matters, arriving at a judgment in both intelligence and medical fields can require the interdisciplinary coordination of various specialists. The development of expertise in the medical field was not only the province of individual cognition, but required the creation of specialties and sub-specialties focused on specific functional systems such as neurology and orthopedics. But the broader implications of this knowledge can be lost if the contribution of the specialty is not reintegrated into a holistic assessment of the patient's health. This entire dynamic parallels the analytical specialization by the CIA's Directorate of Intelligence according to analysts' political, military, economic, and leadership disciplines. In intelligence, the integration of the various specialist perspectives can at times be difficult, especially when events overseas appear to have multiple explanations that cross the various disciplines. The integration of perspectives can be easy if they all point towards one explanation, but if different intelligence disciplines or medical specialties have different explanations, doing so can be very difficult.

The parallels between the collection and analysis of information in the medical and intelligence fields indicate that the underlying analytic processes are similar, but these similarities also mean that the causes of inaccuracy in their respective fields are also parallel.

PARALLELS IN CAUSES OF INACCURACY

Medical diagnosis and intelligence analysis have similar causes of inaccuracy due to their similarities in collection and analysis. They share at least three causes of inaccuracy; they undoubtedly have many additional sources of error in common.

First, inaccuracy in both intelligence analysis and medical diagnosis can arise from the unavoidable limitations in the collection and analysis of information. Both medicine and intelligence collection are subject to some amount of both random and systematic error resulting from built-in limitations of the collection instruments themselves, and as a result the information that feeds into the subsequent analysis is never an exact representation of reality. For example, the ability of modern medical imaging modalities such as the CT and the MRI to accurately depict anatomic structures is limited by technical constraints of spatial-temporal resolution and signal-to-noise ratio. An equivalent in the intelligence world could be the subjective interpretations that case officers inevitably include in their interpretations of an asset's reliability and the information he or she provides. In the aggregate, these errors can combine to cause inaccuracy on the margins of both intelligence analysis and diagnosis.

Additional inaccuracy at the analytic level compounds whatever errors may have been incorporated during the collection of information.[17] As has been pointed out elsewhere,[18] the analytic process itself is subject to an individual analyst's cognitive limitations, and as a result ''analysis is subject to many pitfalls—biases, stereotypes, mirror-imaging, simplistic thinking, confusion between cause and effect, bureaucratic politics, groupthink, and a host of other human failings,'' according to administrators at the Joint Military Intelligence College.[19] In the medical field, one of the most often repeated pearls of wisdom for diagnosing patients is that ''uncommon manifestations of common diseases are more common than uncommon manifestations of uncommon diseases,'' or ''when you hear hoofbeats, look for horses and not zebras.'' The challenge faced by many neophyte physicians is to adhere to this medical truism. The background noise that arises from reading about and observing a multitude of new and unusual diseases can obscure the signals of a more workaday illness. The same can be said for intelligence analysts as well, and controlling for possible causes of error in analysis has become the subject of many intelligence articles.[20]

In addition, errors may arise in both intelligence analysis and medical diagnosis due to problems intrinsic to the implementation of the scientific method. The deductive approach used by practitioners in both fields requires some inductive ability to distinguish the relevant information (signals) from the irrelevant (noise). Generally, conceptual frameworks built out of hypotheses that tie together a number of cause/effect relationships are used, but distinguishing the signals can still be a difficult task. As Walter Laqueur observes, ''like the intelligence analyst, the clinician faces the problem of detecting signals. A weak signal may be drowned in background noise. Perhaps the most frequent of such situations facing him occurs when taking the case history of a loquacious patient. ... In each case, a post mortem shows that all the necessary information was available but it did not register, sometimes because of an abundance of clues, sometimes because of a temporary eclipse in observation or critical acumen.''[21] In medicine, an example of this kind of error would be the mistaken attribution of a health problem to an innocuous external factor that was correlated with the problem but not the cause of it. Specifically, the long-term false attribution of peptic ulcers to ''spicy food, acid, stress, and lifestyle'' rather than the presence of a bacteria (*Helicobacter pylori* or *H. pylori*) that ''causes more than 90 percent of duodenal ulcers and up to 80 percent of gastric ulcers'' is an example of an error due to the complexities of distinguishing signals from noise in a medical context.[22] In the intelligence arena, many possible explanations exist for specific outcomes, such as a foreign government's negotiating position at an international conference, but in many cases intelligence analysts may have difficulty determining whether the position taken is due to underlying political forces, economic conditions, or the agenda of a single individual or groups of individuals. Errors in the interpretation of events are likely when the conceptual frameworks for explaining the outcome are insufficiently specified.

Finally, errors may occur in both intelligence analysis and medical diagnosis due to the misapplication of the scientific method. For example, in mid-2003 the *Washington Post* reported that ''recommended 'best practices' were followed about two-thirds of the time in diagnostic testing,'' presumably leading to suboptimal outcomes.[23] The parallels to intelligence analysis are obvious. If the practitioner does not follow analytic tradecraft, inaccuracies could be incorporated into the analytic process unless specific means are implemented to ensure that the conclusions follow directly from the evidence.

Because the mechanisms used to collect and analyze information in both fields are so similar, the causes of inaccuracy are also similar. But, deriving lessons from analogies requires an understanding of the limits of the analogy that are defined by the differences between the fields. In addition

to the substantial similarities between the intelligence and medical fields, substantial differences exist as well.

DIFFERENCES BETWEEN INTELLIGENCE ANALYSIS AND MEDICAL DIAGNOSIS

Prominent differences between intelligence analysis and medical diagnosis limit the analogy and the lessons that can be derived from it. Differences exist in the kinds of problems that practitioners in both fields address, the kinds of knowledge used to address them, the reliability of the information acquired, and the use of the information in decisionmaking. Nonetheless, their existence does not remove all utility from the analogy. In each case, the analogy continues to hold between intelligence analysis and a subset of the medical profession.

Differing Types of Problems

Intelligence analysts and physicians obviously address different kinds of problems. In general, intelligence analysts assess the international environment for changes that could affect U.S. security interests. While the identification of threats is a part of an intelligence analyst's responsibility, the analyst usually has to first assess whether or not there is a threat, while a physician's diagnostic mission tends to be more constrained. Patients generally seek medical attention when they have identified an existing health problem, and look to the physician to identify its cause and establish a course of treatment for its resolution. As a result, the intelligence analyst's mission is roughly equivalent to the subset of the medical diagnostic range known as preventive medicine, where patients are assessed for underlying health problems for which no symptoms may be observable or identifiable. Alternatively, subsets of each medical diagnostic and intelligence analysis specialty may deal with a comparable range of issues. For example, intelligence analysts who track identifiable problems over time, such as nuclear proliferation or terrorism, may be more analogous to the physician who assesses the condition of a patient with a chronic health problem.

Epistemological Foundations

Intelligence analysis and medical diagnosis are grounded in different epistemological foundations, with implications for how practitioners in the respective fields make decisions.[24] Specifically, the greater accumulation of knowledge and theory in the physical sciences than in the social sciences provides medical practitioners with a relatively larger empirical base and

more precise causal relationships, enabling them to make diagnoses and prognoses with a greater level of certainty than their intelligence counterparts.

Medical knowledge of relationships between cause and effect exists at a high level of specificity because the development of medical science—built on the physical sciences—has allowed practitioners to aggregate knowledge and build a progressively larger base of information regarding the effects of diseases and pathologies on human health. The key to this growth has been the ability of medical science to research the causes and effects of various diseases in laboratories where researchers can limit the influence of extraneous factors. In addition, medical researchers use incidence rates of disease throughout the population as a way to approximate many ''experiments'' simultaneously. Once medical researchers have identified the pathologic or cellular basis for disease and the full range of effects on a typical patient's health, new physicians are taught the patterns of signs and symptoms in medical school, and are kept updated on current research through their continuing professional education programs. As greater knowledge of cause and effects is accumulated, more detailed and specific diagnoses and prognoses become possible.

By way of contrast, most causal relationships derived from the social scientific theories of interest to intelligence analysts are still indeterminate due to the infrequent occurrence of important events on the international stage, and the analyst's inability to test hypotheses through laboratory experiments. Intelligence analysts rely primarily on social scientific theories that explain nation-state behavior at various levels of analysis, but none of these theories is as precise as those in the physical sciences. For example, intelligence analysts use international relations theory to ground their analyses at the systemic level; political science and economic theory to ground their analyses at the state level; and psychology to ground their analyses at the individual level. Yet, for the most part, these theories do not provide specific identifiable patterns akin to those physicians use to diagnose pathology, because social scientists have been unable to define the circumstances under which the various theories can individually explain state behavior. Economics may be the social scientific theory that most closely resembles the physical sciences, but even it has difficulty with precise explanations because of its assumptions of perfect information and rational behavior that rarely seem to occur in the real world. As a result, Yale University historian John Lewis Gaddis asserts that most social science theories ''tend to be parsimonious, attributing human behavior to one or two basic 'causes' without recognizing that people often do things for complicated combinations of reasons'' and as a result are ''static, neglecting the possibility that human behavior, individually or collectively, might change over time.''[25] Gaddis concludes that as a result of these

tendencies, ''the social sciences are operating ... at roughly the level of freshman physics experiments [and] that's why the forecasts they make only occasionally correspond with the reality we subsequently encounter.''[26] If the theories that intelligence analysts use to forecast future events produce accurate assessments only infrequently, it is no surprise that intelligence analysis forecasts follow a similar path.

Over time, social scientists have been able to accumulate knowledge about the causes of larger international events—such as war or international cooperation—but for the most part these explanations are very general and lack the precision necessary to explain or forecast the kinds of specific events that intelligence analysts are interested in. In medical terms, intelligence analysts have a similar understanding of the patterns that underlie international relations that physicians had for disease some two centuries ago. Some social scientists have attempted to model international relations in a similar way to the physical sciences, but these models have been—for the most part[27]—found wanting for intelligence purposes. As Walter Laqueur explains, ''For a long time, military and foreign political intelligence have tried to become scientific, or at the very least more scientific. ... But, inasmuch as assessment is concerned, the outcome of a search for a scientific theory improving the predictive capacity of intelligence has been quite disappointing.''[28] As a result, for the most part, medical diagnoses can be made with greater precision and accuracy than can intelligence analysis.

Nonetheless, parallels do exist between medical diagnosis and intelligence analysis in certain areas where medical knowledge has not yet acquired sufficient ability to understand the cause of health problems or their impact on a patient's health. Many diseases and genetic syndromes have no known cause or effective treatment and are deemed ''idiopathic.'' Medical literature frequently attributes the causative agent in these ''idiopathic'' cases to either an ''autoimmune disorder'' or a virus. In other cases, the ability to diagnose various diseases may be fraught with uncertainty and ambiguity. In describing the unpredictable biological behavior of a certain cancer, a major pathology reference text quips ''these tumors don't read textbooks.''[29] Pathologists are supposed to provide the clinician with the definitive ''ground truth'' of any given disease entity, but for one particular class of tumors a surprising degree of internal disagreement occurs over ''final pathologic diagnosis,'' not only at the hospital level, but on a national and international level as well. Finally, the effect of disease on individuals is highly variable. For many years, clinical medicine was taught based on a ''hypothetical 70 kilogram white male.'' Yet physicians recognized through anecdotal experience what is now accepted as fact: few individuals react exactly the same way to the same disease, or the same treatment. To diagnose the patient effectively the

physician must be aware of these differences in presentation, but the medical profession has only recently incorporated this paradigm shift into its therapeutic regimens. As a result, a substantial practical component to medicine requires a combination of experience and judgment that is not codified in any text, but is simply passed down to young physicians in the oral tradition of the clinical wards.

In those cases where levels of uncertainty faced by practitioners in both fields are the same, their methods for handling uncertainty are also similar. Intelligence agencies teach analysts to use alternative forms of analysis to handle unconventional analytic challenges. Similarly, when physicians are not able to make a positive diagnosis immediately because of the inherent ambiguity in medicine's ''gray areas''—when insufficient empiric knowledge exists or a common disease presents atypical or protean manifestations—physicians sometimes resort to alternative diagnostic methods. For example, physicians can treat the patient with the ''tincture of time'' or through ''diagnosing by observing natural history'' where careful, close observation and the allowance of a short passage of time permit the true cause of the disease to ''declare'' itself. Some medical disorders, such as ''fibromyalgia,'' are generally considered by the medical profession to be ''diagnoses of exclusion.'' In other words, such a diagnosis should be made *only* after other more common or potentially serious conditions are ruled out.

Thus, even though medicine may have a large knowledge base of information regarding disease, enabling physicians to make accurate diagnoses in a majority of cases, a large subset of issues persists, where the incidence rates are low or issues are complex, and, as a result, medical knowledge of pathological etiology and resulting signs and symptoms are scant. In these cases, the levels of diagnostic uncertainty approximate those faced by intelligence analysts because of the inexactness of the social science theories they use to interpret the raw intelligence at their disposal.

Rates of Denial and Deception

Because intelligence analysis entails deciphering meaning through a more extensive ambiguity, caused by greater denial and deception than exists in the medical field, intelligence analysts generally labor under greater levels of uncertainty than their medical counterparts. For example, in the intelligence field, concern over whether foreign governments and entities are providing disinformation through U.S. collection capabilities so as to deceive analysts and policymakers leads to pervasive uncertainty over the reliability of almost all information collected. These concerns complicate the assessment and validation process since no piece of evidence can be considered reliable without excessive scrutiny into both its substance and the process by which it was collected.

The bulk of the medical profession does not labor under similar levels of uncertainty resulting from denial and deception efforts on the part of patients. As Walter Laqueur observed: ''There is one important difference: the patient usually cooperates with the medical expert; he has no incentive to hide and to mislead.''[30] As noted, in the medical field some uncertainty is intrinsic in the assessment of information, and other concerns about reliability can creep in, due to laboratory error or errors in patient self-reporting, but, for the most part, the uncertainty is not due to a conscious effort on the part of individuals to manipulate the process. For a sub-set of cases in medicine, however, physicians may also labor under conditions of uncertainty analogous to those in the intelligence world due to denial and deception efforts.

In medicine, intentional deception by patients for purposes of misleading the diagnosis are rare, but can be found in cases where the patient has an underlying incentive to deceive. For example, physicians responsible for making disability determinations, and for managing pain by dispensing narcotics, can encounter patients who attempt to deceive them in order to acquire money or narcotics. In the medical profession, this kind of deception is known as ''malingering,'' and the underlying incentive to deceive is known as ''external or secondary gain.'' In addition, physicians encounter denial in circumstances where a patient is embarrassed or unwilling to share the complete circumstances of an injury. Also, rarer still, are cases of unintentional denial—or patient self-deception—arising from psychological disorders, in which symptoms expressed by the patient are not indicative of underlying health problems. These incidents could be roughly analogous to cases where inaccurate information is possessed by foreign governments and subsequently acquired by intelligence agencies. Examples from medicine include Munchausen syndrome (i.e., a habitual and intentional effort to produce convincing physical or psychological symptoms in order to gain attention through the sick role), and hypochondriasis (i.e., morbid anxiety about one's health with symptoms unattributable to organic disease).[31]

Malingering, hysterical symptoms, and hypochondriasis can be especially difficult to detect, in part, because of a physician's natural reluctance to make such a ''diagnosis'' before an actual organic illness is excluded. As a result, no firm epidemiological data on the incidence of such ''deceptive'' conditions is available Nevertheless, physicians are taught to recognize certain signs of ''functional'' illnesses where no anatomic or pathologic causes can be found. For example, the diagnosis of ''pseudoseizures'' may be established through clinical history alone, or by the absence of signs associated with true seizure disorders. Malingering may be detected when there is an incongruity between claimed injury and an inconsistent mechanism of injury. Ultimately, some cases may require the performance of specialized

tests to exclude a structural problem. ''Hysterical blindness'' can be established by performing a visual-evoked response, where a flash of light in the eye ''evokes'' an electrical signal in the portion of the brain involved in vision, indicating intact visual pathways. Similar tests are used by intelligence practitioners to determine whether a government or individual is being actively deceptive or attempting to prevent the U.S. government from acquiring certain kinds of information.

The relatively higher levels of uncertainty in the intelligence world are due to the greater incentive for foreign governments to deny the U.S. government information on their activities or deceive them regarding the extent of those activities. But the subset of cases in the medical world, where patients have incentives to deceive, can provide analogies and perhaps even lessons that intelligence analysts can adopt to improve their own processes.

ANALOGY TO NATIONAL SECURITY POLICYMAKER PREFERABLE

But the analogy between intelligence analysis and medical diagnosis fails the closer it gets to the decisionmaking process. As Walter Laqueur points out: ''the comparison between medicine and intelligence ... cannot be carried beyond a certain point; the doctor engages not only in diagnosis but also in curing the patient.''[32] Because most physicians are also responsible for treating patients, they are in essence roughly equivalent to national security decisionmakers. Yet, an in-depth examination of the distinction between diagnosis and treatment in medicine and intelligence and decisionmaking in foreign policy helps define the extent to which the analogy can be used as a means of exploring alternative ways of doing business.

Assessing the importance of information within a decisionmaking process first requires understanding how information is used by decisionmakers. Harvard University historian Ernest May uses a simple framework to summarize that process:

> [At] any time or place, executive judgment involves answering three sets of questions: ''What is going on?''; ''So what?'' (or ''What difference does it make?''); and ''What is to be done?'' The better the process of executive judgment, the more it involves asking the questions again and again, not in set order, and testing the results until one finds a satisfactory answer to the third question—what to do (which may be, of course, to do nothing).[33]

In national security policymaking, an individual decisionmaker requires information regarding international events and issues that have the potential to affect United States national interests (what's going on?); the analysis and evaluation of this information (so what?); and the ability to create and implement effective policies (what is to be done?). In medicine,

the decisionmaking process works similarly. A treating physician must first assess the patient and diagnose the cause of any problems, then evaluate the significance of these problems by creating a prognosis, and finally decide on a course of action to treat the patient. But national security decisionmaking occurs on both individual and organizational levels, thereby greatly complicating the analogy between medical diagnosis and intelligence analysis.

National security policymakers generally follow the decisionmaking process laid out by Professor May, but a policymaker does not derive information as directly from first-person experience as does a physician from an interview and subsequent examination of the patient. Rather, in the national security world, information is collected, filtered, analyzed, and disseminated in an organizational context, so that any assessment of the role that intelligence plays in national security decisionmaking must also be grounded in an institutional context. National security policymakers have staffs that provide them with information-acquisition, analysis, and decisionmaking assistance. Additional similar assistance is provided by intelligence agencies. In fact, intelligence analysts at the CIA are trained to answer two of Professor May's three questions by explicitly addressing the ''what'' and the ''so what'' in their finished intelligence analysis. However, answering the question ''what is to be done?'' in the national security realm is prohibited for intelligence analysts while they monitor the international environment for foreign policymakers, and alert them to any changes that might affect national interests. Intelligence is thus subordinate to policymaking, and resembles the product of the type of analysts, described by Geoffrey Vickers, as the kind who monitor the decisionmaker's environment for any changes and acts as a ''watchdog on a chain; he can bark and alert the householder, but he cannot bite.''[34]

National security decisionmakers, however, do not make decisions only after receiving finished intelligence analysis; in many cases they are their own analysts, and have entirely separate sources of information. Many policymakers have access to raw intelligence reporting as well as finished intelligence analysis; they also have separate information streams outside the intelligence community, such as contacts in academia, think tanks, the domestic and international business world, and foreign government officials. As a result, the medical analogy may be a better fit for comparing the decisionmaking processes of physicians and national security policymakers than intelligence analysts. The eminent international relations scholar Alexander George came to a similar conclusion when he looked at the uses of information in foreign policy decisionmaking:

> Correct diagnosis of a policy problem and of the context in which it occurs should precede and—as in medical practice—is usually a prerequisite for efforts to make the best choice from among treatment options. The analogy with the medical profession is an apt one, since the policymaker, like the physician, acts as a clinician in striving to make a correct diagnosis of a problem before determining how best to prescribe for it.[35]

But even if this analogy between physicians and policymakers works better, physicians rely on the advice of other diagnostic experts because of economies of scale and limitations in both time and expertise. For example, an oncologist may be the ''analyst'' and ''policymaker'' for a given patient, but relies on other analysts, such as the radiologist, to identify the initial manifestations of disease, the surgeon to provide a tissue sample, and the pathologist to give the ''final answer.'' In this framework, the medical equivalent of an all-source intelligence analysis would be a delegated diagnostic sub-specialty with access to most of a physician's data sources, including written reports of patient interviews, but no role in the treatment decision process. This describes the role of a ''consulting physician'' who is presented with a clinical problem outside the primary physician's expertise. The consultant is usually asked to review data and formulate a diagnosis or differential diagnosis, but not necessarily to implement treatment. One type of consulting physician is a radiologist, who—while closer to the intelligence equivalent to an imagery analyst—helps diagnose but does not treat, and hence, does not implement ''medical policy.''

PRELIMINARY LESSONS

This examination of the analogy between intelligence and medicine indicates its possible use in acquiring greater insight into intelligence processes, as well as serving as a source of models for improving analytic processes. The obvious similarities between intelligence analysis and medical diagnosis indicate possible avenues for intelligence practitioners to derive lessons that could improve analytic accuracy. For example, the processes of medical diagnosis are vulnerable to the same pathologies that cause intelligence failure, and techniques developed to improve the accuracy of diagnoses or prevent malpractice based on diagnostic error may also improve the accuracy of intelligence analysis. In 2003, a *New York Times* article highlighted a team of radiologists who established a feedback process that improves the accuracy of their diagnosis. A similar mechanism could be used to improve the accuracy of intelligence analysis.[36] Alternatively, the medical subspecialties have long relied on the monthly ''morbidity and mortality conference'' (the ''M and M'' conference) as a forum to discuss

complications in diagnosis and treatment, and methods of preventing adverse events and outcomes. Both minor and major complications in patient care are discussed. Though physician participants in these regular ''M&M'' conferences often provide brutally frank assessments of their colleagues' patient care, they are meant to be a learning tool for doctors at all stages of their career. Perhaps the intelligence community might adopt a similar periodic peer review process, not only to discuss ''intelligence failures'' of the sort that makes newspaper headlines, but as a spot check on other forms of basic and current intelligence.

In addition, each difference between intelligence analysis and medical diagnosis conversely points to a more specific way that aspects of intelligence analysis and medical diagnosis are similar in a subset of cases. Lessons for the practice of intelligence analysis can be derived from each. The medical equivalent of an all-source intelligence analyst would be a diagnostic assistant in a preventive medicine context—possessing access to all information that the treating physician needs—required to use indeterminate indicators to diagnose patients who may have a rare disease but also an incentive to misrepresent the health problem. The difficulties that medical professionals face during the early stages of identifying and preventing a novel disease such as AIDS might approximate the level of complexity encountered by intelligence analysts daily. Nonetheless, each difference between the professions highlights a dynamic where the analogy still holds, and further examination may provide greater benefit for each profession.

For example, a lesson that intelligence could learn from medicine's experience with preventive medicine is that, in many cases, the attempt to assess developing health problems diverts substantial resources away from addressing existing health problems. The medical profession has learned that ''many diagnostic tests ... are given routinely to apparently healthy people in the name of prevention,''[37] and that this focus on testing, even where there may not be any health problems, leads to the collection of excessive amounts of information. As a result, the medical profession must divert substantial diagnostic resources to analyzing the additional information, even though most of it will indicate that no problem exists. The lesson for intelligence agencies is that the possibility of collecting information does not mean that it should be, because the additional information may have a diversionary affect on analytic expertise.

Intelligence agencies could also learn from medicine's foundation in the physical sciences that specific procedures may have to be implemented in order to aggregate knowledge and establish causal relationships specific enough to be useful for purposes of intelligence analysis. Social scientists in academia do not have access to the kinds of specific data that intelligence analysts do. As a result, their models are usually general and at

a high level of abstraction. Due to security and classification concerns, however, no established process exists for creating the kinds of indicator patterns that intelligence analysts would find useful. Where would medicine be if it had remained empirical, and knowledge not aggregated into theory? The establishment of an internal intelligence community unit of social scientists devoted to the production of mid-level theory and hypotheses useful for intelligence analysts would provide intelligence agencies with an improved base of theory for finding meaning in the raw intelligence. In addition, new attempts are being made to improve the way medicine learns about disease and its impacts. In 2003, the National Institutes of Health started a multidisciplinary collaborative effort ''to improve the diagnosis ... of diseases,'' including ''identify[ing] scientists who are exceptionally creative thinkers, and award[ing] them $500,000 grants'' as a way to foster idea generation and cross-pollination.[38] Similar efforts in the intelligence community could draw together disparate experts with idiosyncratic knowledge residing in the corners of the intelligence community, and provide them with the opportunity to assess intractable intelligence issues from new multi-disciplinary perspectives. In the end, not every collaborative project has to break new ground for such an approach to be successful; as with scientific research and development, all that is needed is a periodic breakthrough for the approach to be worthwhile.

Discerning the Deceivers

In the area of ''denial and deception,'' the intelligence community might also learn from medicine's experience in identifying how physicians distinguish malingering from legitimate patient health concerns. The incidence of malingering may be under-diagnosed when deception goes undetected. Conversely, the incidence of malingering may be over-diagnosed in cases where medical knowledge has not been able to fully capture the complexity of the human physiological system. As noted earlier, gray areas exist in medicine at the boundary between understanding and learning. Because physicians may not fully understand the underlying causal mechanisms, patients with rare diseases may be diagnosed as malingerers even though the disease itself is real, but poorly understood by medicine. The challenge for physicians, therefore, is to remain cognizant of the potential for deceptive behavior on the part of patients, but not to the point that legitimate signs and symptoms are dismissed out of hand. In the intelligence world, this observation may have immediate relevance in the assessment of the status of Iraq's weapons of mass destruction (WMD). In that case, intelligence analysts apparently assumed that Saddam Hussein's failure to document the destruction of all of his WMD indicated that he was deceiving Western governments and diverting the weapons elsewhere, despite his protestations

to the contrary. In the end, a warning from the medical world applies just as well to concerns of deception in the intelligence arena: ''to recognize that [because] the detection of malingering can be very difficult'' any diagnosis of it ''must be sustained by evidence.''[39]

Lessons for intelligence could also come from acknowledgement of the role that intelligence information plays in decisionmaking, and explicit efforts to improve the kinds of information provided to policymakers. For example, according to a David Brown in the *Washington Post*, ''the body of medical research on just about any important subject is vast—too big for the average practitioner to grasp,''[40] just as it is in national security decisionmaking. To address this problem, a government agency—the Agency for Healthcare Research and Quality (AHRQ)—has established ''evidence-based practice centers'' at thirteen universities, and is paying researchers there to ''examine all the studies on a given question, evaluate their validity ... and ultimately extract conclusions—the ''best evidence''—from the mass of information.'' While this medical research addresses both diagnosis and treatment, an intelligence adaptation might be to similarly organize and assess both raw intelligence sets and finished intelligence—to identify the good and the bad—for the benefit of providing decisionmakers with a better sense of the intelligence information that already exists on a particular topic. On a broader scale, the AHRQ's mission is to assess how medical processes work, and how the government might help improve those processes.[41] A similar unit inside the intelligence community with free rein to assess management practices could be invaluable.

Crossing Professional Lines

Finally, the lessons that intelligence can draw from an examination of the similarities and differences with the medical profession indicate the importance of looking to analogous professions for ideas that can be adapted to an intelligence context. Doing so might help improve finished intelligence production processes and the incorporation of intelligence into decisionmaking. Analogies serve a number of purposes, such as aiding communication about difficult topics by finding illustrative examples in other fields, or by more directly affecting existing ways of doing business through the incorporation of tools that exist to achieve similar purposes in other fields. Many of the challenges intelligence analysts face are not as unique as its practitioners believe, but the insularity of the field prevents them from being able to identify the lessons from other professions that could be useful as models to follow.

As a result, the first task is to identify analogous professions, and examine them for the lessons they might provide. Any profession that encounters

similar problems—such as medicine, journalism, law, or law enforcement—may provide fertile ground for deriving ideas to improve existing practices. Perhaps if intelligence analysts adopted methods from analogous professions—or adapted them to the unique requirements of intelligence analysis—some of the obstacles they currently face in accurately portraying their understandings of the international environment could be overcome.

REFERENCES

[1] Walter Laqueur, ''The Question of Judgment: Intelligence and Medicine,'' *The Journal of Contemporary History*, Vol. 18. 1983, pp. 533–548. See also: Walter Laqueur, *A World of Secrets: The Uses and Limits of Intelligence* (New York: Basic Books, 1985), pp. 302–305.

[2] According to *Dorland's Medical Dictionary*, a ''sign'' is ''any objective evidence of disease'' that can be independently observed by the physician, whereas, a ''symptom'' is ''any subjective evidence of disease'' reported by the patient. *Dorland's Pocket Medical Dictionary*, 26th ed. (Philadelphia: W.B. Saunders, 2001).

[3] Walter Laqueur, ''The Question of Judgment,'' p. 535.

[4] Ibid.

[5] Ibid., pp. 534–535.

[6] According to *Dorland's Medical Dictionary*, ''diagnosis'' is the determination of a cause of disease, and ''prognosis'' is ''a forecast of the probable course and outcome of a disorder.''

[7] See United States Department of Defense, Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: Joint Chiefs of Staff, 2003), p. 55.

[8] Janice Williams, Henry Schneiderman, and Paula Algranati, *Physical Diagnosis: Bedside Evaluation of Diagnosis and Function* (Baltimore: Williams and Wilkins, 1994), pp. 1–5.

[9] For parallels in the technologies used in medicine and intelligence, see: Sam Grant and Peter C. Oleson, ''Dual Use of Intelligence Technologies: Breast Cancer Detection Research,'' *Studies in Intelligence*, Vol. 1, No. 1, 1997, at http://www.cia.gov/csi/studies/97unclass/cancer.html

[10] Richards J., Heuer, J. *Psychology of Intelligence Analysis* (Washington, DC: CIA Center for the Study of Intelligence, 1999), pp. 61–62.

[11] Stephen Marrin, ''Improving CIA Analysis by Overcoming Institutional Obstacles,'' in Russell G. Swenson, ed., *Bringing Intelligence About: Practitioners Reflect on Best Practices* (Washington, DC: Joint Military Intelligence College, 2003), pp. 40–59.

[12] Mark V. Kauppi, ''Counterterrorism Analysis 101,'' *Defense Intelligence Journal*, Vol. 11, No. 1, Winter 2002, p. 47.

[13] Richards Heuer, *Psychology of Intelligence Analysis*, p. 62.

[14] Ibid. While Heuer's observations may be true in theory, the medical profession is currently experiencing a debate over the possible over-collection of data that does not conform to medical diagnostic theory. This problem with over-collection has its parallels in the intelligence world as well. As a result, both fields struggle with allocation and utilization of scarce resources.

[15] Ibid., pp. 45, 101–102.

[16] Ibid., p. 26. In this section Heuer cites Arthur S. Elstein, Lee S. Shulman, and Sarah A. Sprafka, *Medical Problem Solving: An Analysis of Clinical Reasoning* (Cambridge, MA: Harvard University Press, 1978), p. 276.

[17] For a list of analytic errors that apply to both intelligence analysis and medicine, see: Walter Laqueur, "The Question of Judgment," p. 541.

[18] Stephen Marrin, "Improving CIA Analysis by Overcoming Institutional Obstacles," pp. 40–59.

[19] Ronald D. Garst and Max L. Gross, "On Becoming an Intelligence Analyst," *Defense Intelligence Journal*, Vol. 6, No. 2, 1997, p. 48.

[20] For more on the causes of analytic failure, see Richards Heuer, "Improving Intelligence Analysis: Some Insights on Data, Concepts, and Management in the Intelligence Community," *The Bureaucrat*, Vol. 8, No. 1, Winter 1979/80, pp. 2–11. See also, Richard Betts, "Analysis, War and Decision: Why Intelligence Failures Are Inevitable," *World Politics*, Vol. 31, No. 1, October 1978.

[21] Walter Laqueur, "The Question of Judgment," p. 544.

[22] For more on this dynamic, see: Center for Disease Control (CDC) Website; "Fact Sheet: Helicobacter pylori and Peptic Ulcer Disease." http://www.cdc.gov/ulcer/md.htm

[23] David Brown, "Medical Care Often Not Optimal, Study Finds," *The Washington Post*, 26 June 2003, p. A02.

[24] For more on intelligence epistemology, see: Mark M. Lowenthal, "Intelligence Epistemology: Dealing with the Unbelievable," *International Journal of Intelligence and CounterIntelligence*, Vol. 6, No. 3, Fall 1993, pp. 319–325.

[25] John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (New York: Oxford University Press, 2002), p. 57.

[26] Ibid., p. 60.

[27] An exception might be models developed internal to the intelligence community that enable them to assess events of interest such as political stability. For more, see: Stanley A. Feder, "FACTIONS and Policon: New Ways to Analyze Politics," in *Inside CIA's Private World: Declassified Articles from the Agency's Internal Journal, 1955–1992*, H. Bradford Westerfield, ed. (New Haven: Yale University Press, 1995), pp. 274–292. Also see: Stanley A. Feder, "Forecasting for Policy Making in the Post Cold-War Period," *Annual Review of Political Science*, Vol. 5, June 2002, pp. 111–125.

[28] Walter Laqueur, "The Question of Judgment," p. 533.

[29] Ramzi S. Cotran, Vinay Kumar, Stanley L. Robbins, *Robbins Pathologic Basis of Disease*, 4th ed. (Philadelphia: W.B. Saunders Company, 1989).

[30] Walter Laqueur, ''The Question of Judgment,'' p. 535.
[31] See *Dorland's Pocket Medical Dictionary*, 26th ed.
[32] Walter Laqueur, ''The Question of Judgment,'' p. 545.
[33] Ernest R. May, *Strange Victory: Hitler's Conquest of France* (New York: Hill and Wang, 2000), pp. 458–459.
[34] Geoffrey Vickers, *The Art of Judgment: A Study of Policy Making* (Thousand Oaks, CA: Sage Publications, 1995), pp. 225–226.
[35] Alexander L. George, *Bridging the Gap: Theory and Practice in Foreign Policy* (Washington, DC: United States Institute of Peace Press, 1993), p. xx.
[36] Michael Moss, ''Mammogram Team Learns from Its Errors,'' *The New York Times*, 28 June 2002, p. A1. Also cited in Steven Rieber, ''Intelligence Analysis and Judgmental Calibration,'' *International Journal of Intelligence and CounterIntelligence*, Vol. 17, No. 1, Spring 2004, pp. 97–112.
[37] Shannon Brownlee, ''The Perils of Prevention,'' *The New York Times*, 16 March 2003, p. 52. For more on the diversion of resources to address aspects of prevention, see Gina Kolata, ''Annual Physical Checkup May Be an Empty Ritual,'' *The New York Times*, 12 August 2003, p. 71.
[38] Rick Weiss, ''Cross-Pollination in Pursuit of Cures: NIH Launches Drive to Increase Collaboration Among Scientific Disciplines,'' *The Washington Post*, 1 October 2003, p. A2.
[39] ''Malingering: Can It Be Detected?,'' Med League Support Service Inc. http://www.medleague.com/Articles/Medical%20Topics/Detecting_Malingering.htm
[40] David Brown, ''Director Seeks 'Just the Facts' to Improve Medical Care,'' *The Washington Post*, 5 February 2003, p. A2.
[41] Agency for Healthcare Research and Quality Website: http://www.ahrq.gov/