Improving Diagnostic Pathology Capacity for Global Cancer Care

Where to Start

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In this issue of the Journal, Dayal and colleagues1 report their findings on benign uterine tumors removed from women in north India. The study they conducted was straightforward: determine the type and incidence of a set of tumors from one geographic area at one point in time. As an observational study, it was designed and conducted well. The underlying question, however, was far more important and highlights one of the most vexing issues facing global health: how to diagnose and treat cancer.

For those of us trained in America, Europe, or former Commonwealth countries, we often forget that much of what we know, what we do, and how we affect patient care simply does not exist in many parts of the world. At the most fundamental level, many regions and countries lack health statistics and epidemiologic data to such a degree that it is not possible for governments to rationally allocate resources and develop large-scale cancer diagnosis and treatment programs. This is particularly true for cancer epidemiology: there just are no data for many areas, and where data exist, the findings are often patchy in distribution, based on older classification schemes, and do not take into account substantial changes in demographics, movement of populations, emergence of new diseases, and changes in diagnostic methods. For too many regions and countries we do not know what cancers occur there, the relative prevalence of each cancer type, how these malignancies behave clinically and pathologically, how they affect morbidity and mortality for populations living in those areas, response to treatment, or prognosis. The effect of cancer on populations as a whole is even less well understood in terms of the impact on families, social structures, the economy, and political stability.

The many reasons for a lack of diagnostic pathology services have been studied in some regions and countries, yet the findings are not always intuitive and can vary from place to place. Many efforts at building diagnostic capacity, even successful ones, have had to learn hard lessons about what it takes to build sustainable capacity, be willing to admit what works and what does not work, be adaptable to changing conditions, and recognize successes and failures. There is no single, simple solution to this issue. In developing a model to guide capacity-building programs, it may be best to consider cancer diagnosis and treatment as a cycle so that one understands both the linear process and also the effects of each step on others.2

For example, because of a lack of diagnostic capacity and particularly diagnostic pathology capacity, effective cancer treatments have not been developed in many hospitals and clinics. This results in a lack of diagnostic, treatment, and outcomes data, which precludes governments’ ability to develop long-term teaching and training programs necessary to build a sustainable work force to care for patients with cancer. As a result, many areas lack oncologists, oncologic surgeons, gynecologic oncologists, radiologists, experts in palliative care, and trained nurses. Without these specialists, there is no pressure on governments, hospitals, or clinics to demand better pathology and clinical laboratory services, diagnostic imaging services, and other components of cancer treatment programs. Without these services, it is difficult or impossible to recruit and retain specialists in cancer care. So this vicious cycle continues, unbroken, unchanged, and in many areas, unnoticed.

Within diagnostic pathology itself, there is another cycle. Lack of demand for diagnostic pathology services is one component, but what are the others? In many regions and countries,
there are too few (or even no) pathologists to provide pathology services, let alone train the next generation. 2 Many of these pathologists double as forensic pathologists, which further limits the time available for them to provide diagnostic services. Inadequate staffing results in an inability to collaborate with colleagues, share experiences, attend meetings, and all the factors that help build a sense of community and professionalism. Inadequate infrastructure is another common problem, which not only limits diagnostic capacity but makes retention and recruitment of pathologists difficult. Lack of a broader infrastructure to push for improvement of diagnostic services is another common problem. Many hospitals do not have a viable tumor board, cancer registry, or any system for assessing the efficacy of cancer care. Without knowledge of the effects of health care interventions on diseases or conditions, there is no sense of progress, no ability to set priorities, and further erosion in the collection and quality of data. All of these issues result in too many pathologists being frustrated with their jobs, making emigration to larger cities or other countries often the only alternative for them to have a satisfying and rewarding career. The result is obvious: another hospital or clinic without diagnostic pathology capacity.

Breaking any cycle, or in this case overlapping cycles, requires performing a gap analysis, obtaining expertise on filling these gaps, knowing what gaps to fill first, and developing a long-range plan for filling gaps sequentially and sustaining those efforts. One obvious question is, “where to start?” For physicians, our training and ethics push us toward immediate allocation of resources that will result in the quickest mitigation of pain and suffering to eventually minimize morbidity and mortality. For policy makers, the priority is the same, but there is a competing—and equally compelling—need to allocate resources to collect basic health care statistics, improve infrastructure, and develop long-range plans for improving the health of all populations. These interests, while often overlapping and complementary, are limited by the lack of sufficient resources to do everything at once. Thus, priorities for allocation of resources must be aligned in the dual context of competing interests and finite and insufficient resources.

The need for adequate pathology services is a critical component in the research aspects of cancer care. Good cancer diagnostic capacity is needed for accurate data regarding cancer epidemiology, outcomes of cancer control and treatment programs, and the basic science of cancer biology. New diagnostic and research methods allow for better understanding of the biology of cancer, which in turn enables the development of better methods for diagnosis and treatment. One recent study addressed another fundamental question about uterine leiomyomas: by using whole-genome sequencing and gene-expression profiling, Mehine and colleagues 3 found that multiple uterine leiomyomas in a given patient may be clonally derived. As noted by the authors of that study, “…accurate molecular classification of uterine leiomyomas…is a prerequisite for the development of targeted therapies against these lesions…” 3 As with the study by Dayal et al, 1 it is a simple yet fundamental question that needs to be answered. As a next step, this study needs to be repeated in different patient populations because the underlying stresses that drive development of these tumors may vary among populations. However, questions such as these cannot be answered in the absence of diagnostic pathology capacity.

One cannot do everything or be everywhere or solve every problem. This is perhaps the most difficult lesson for those who are involved in global health efforts. It is too easy to underestimate the scope and complexity of problems in many areas of the world and to believe that there are simple solutions to these issues or that merely throwing money at problems will make them go away. Through trial and error and many painful lessons, we have learned that long-term commitment of resources, strategic allocation of those resources, and sound delivery of programs and assistance can make a sustained difference in health care. 4, 5 For cancer care, we are only just beginning. An obvious answer to the question of “where to start” is “at the beginning.” For cancer care, this entails the collection of solid, reliable data about incidence, prevalence, biologic characteristics, and distribution of both benign and malignant tumors in specific populations. Generating a rational differential diagnosis is always the first step in developing treatment plans for patients. But to do so, both for pathologists as well as clinicians, we must know what benign conditions coexist with malignant ones and how to tell them apart in a reliable, accurate, and reproducible way. Once we have that knowledge, we can better understand which resources are needed to provide the right types and quantities of cancer treatments and to guide policy makers in the allocation of those resources. The study by Dayal and colleagues 1 is an excellent example of where to start.

References