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The Intersection Of Public Health Data And Rehabilitation Practice

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Abstract

It is anticipated that the number of older adults with impairments or limitations will increase from approximately 14 million today to more than 28 million in 2030. The intent of this article is to illustrate the place of public health and population-level data in understanding current and future impacts on rehabilitation practitioners, the services they provide, and the clients they serve. Rehabilitation professionals can use public health data, like the Census and Behavioral Risk Factor Surveillance System, to facilitate data-driven planning. To explain this notion, we introduce basic public health concepts as well as aging and disability-related data examples.

The Intersection of Public Health Data and Rehabilitation Practice

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It is anticipated that the number of older adults with impairments or limitations will increase from approximately 14 million today to more than 28 million in 2030. The intent of this article is to illustrate the place of public health and population-level data in understanding current and future impacts on rehabilitation practitioners, the services they provide, and the clients they serve. Rehabilitation professionals can use public health data, like the Census and Behavioral Risk Factor Surveillance System, to facilitate data-driven planning. To explain this notion, we introduce basic public health concepts as well as aging and disability-related data examples. **Key words:** *behavioral risk factor surveillance system*, *census*, *epidemiology*, *population surveillance*, *public health*, *rehabilitation*

IN a recent review of national data, an Institute of Medicine committee concluded that there appears to be a steady state in the percentage of adults 65 years and older who report an activities of daily living disability and a decline in the percentage of older adults who have an instrumental activity of daily living disability.[1] However, because of the aging "baby boom" generation, the *number* of older adults who are reaching 65 years and will need services to support independence over the coming decades is projected to increase. Concurrently, the demand for institutional care and related services is expected to increase. It is anticipated that the number of older adults with impairments or limitations will increase from approximately 14 million today to more than 28 million in 2030. This figure likely is conservative; other estimates project an increase to 38 million by 2030.[1]

For rehabilitation practice, these projections of aging and disability represent a potentially increasing market for services, but render little assistance in understanding the local population of older adults and their needs. The intent of this article is to illustrate the place of public health and population-level data in understanding current and future impacts on rehabilitation practitioners, the services they provide, and the clients they serve.

PUBLIC HEALTH AND REHABILITATION PRACTICE

Public health is defined by a population perspective of health and disability. According to the 1988 Institute of Medicine report, *The Future of Public Health*, its mission is "fulfilling society's interest in assuring conditions in which people can be healthy."[2(p7)] Public health practice centers around 3 core functions: assessment, policy development, and assurance.[2] The assessment function includes population-level surveillance through ongoing and reliable mechanisms such as the Behavioral Risk Factor Surveillance System (BRFSS), National Health Interview Survey, or

the Census. The data generated from assessment activities are analyzed and interpreted to develop relevant, data-driven policy. A variety of public health agencies, such as local and state health departments, or federal agencies like the Food and Drug Administration, then work to ensure these policies are implemented successfully and equitably across a community or population. These core functions are considered cyclical, because ensuring public health often requires new assessments and policy modifications.

According to the Institute of Medicine report, *Who Will Keep the Public Healthy?* public health professionals include both those who are educated in the field and those who work to improve health through a population focus based on the ecological model of health.[3] The ecological model is one in which multiple factors including innate traits, individual behaviors and characteristics, and the natural and built environment interact to produce health outcomes.[3] Although rehabilitation professionals may not have public health training, they may subscribe to the ecological model and as such consider the population level or think about health as a state influenced by personal, environmental, or other broader external factors (eg, policy factors).

In this article, we use the term *rehabilitation professionals* generally, to include any occupational therapist, physical therapist, rehabilitation counselor, or other healthcare professional who works with aging adults or populations with chronic diseases. On the basis of the tenets of individual health professions and the Institute of Medicine report, *Enabling America*, it is presumed that rehabilitation professionals, as classified in this article, are committed toward restoring or developing functional capacity through changes in individual characteristics and the environment.[4]

Clearly, similarities exist in the conceptualization of health among public health and rehabilitation, as public health is essentially a discipline that proclaims to prevent poor health-related outcomes at a population level by considering both personal and environmental factors. The fields, however, have developed somewhat independently, and thus the tools and terminology shared by the 2 disciplines may interfere with communication and collaboration.

HOW DO REHABILITATION PRACTITIONERS UNDERSTAND AND PLAN FOR CLIENT MARKETS?

Examples that illustrate the similarities between public health and rehabilitation exist in the literature. Gitlin and colleagues evaluated the impact of a combined physical therapy and occupational therapy intervention on mortality among community-dwelling older adults.[5] The randomized intervention group, which received home modifications and education on safety, problem solving, balance, and other functional aspects, had lower mortality rates than the control group at 14 months. This result is meaningful at the population level for rehabilitation professionals and older adults who choose to age-in-place. Likewise, other risk-factor-identification studies[6] and intervention studies involving rehabilitation services[7] incorporate the concept of the ecological model in investigating health outcomes among older adults. On interviewing an interdisciplinary team of rehabilitation professionals working with patients in their homes following stroke, Wholin et al report a number of individual, interpersonal, and environmental factors that facilitate the transition from hospital to home care.[7]

To further explain the notion of using public health data to understand and plan for client markets, we introduce basic public health concepts along with aging or disability-related examples. The reader is referred to Table 1 for definitions of standard epidemiology terms used in this article.

UNDERSTANDING PUBLIC HEALTH DATA

Information for data-driven policy and planning activities generally comes from

Table 1. Common epidemiologic terms[8]

Term	Definition
Denominator	The lower portion of a fraction used to calculate a rate, ratio, or prevalence. This is the population at risk in the calculation of a rate or ratio
Incidence	The number of new events, eg, new cases of a disease in a defined population, within a specified period of time
Incidence rate	The rate at which new events occur in a population. The numerator is the number of new events that occur in a defined period; the denominator is the population at risk of experiencing the event during this period
Population	The whole collection of units (the "universe") from which a sample may be drawn; not necessarily a population of persons, the units may be institutions, records, or events
Prevalence	The number of events, eg, instances of a given disease or other condition, in a given population at a designated time. The term usually refers to the situation at a specified point in time (point prevalence). Note that this is a number, not a rate
Proportion	A type of ratio in which the numerator is included in the denominator. The ratio of a part to the whole, expressed as a decimal fraction (eg, 0.2), as a standard fraction (15), or as a percentage (20%)
Risk factor	An aspect of personal behavior or lifestyle, an environmental exposure, or an inborn or inherited characteristic that, on the basis of epidemiologic evidence, is known to be associated with health-related condition(s) considered important to prevent
Sample	A selected subset of a population. A sample may be random or nonrandom and may be representative or nonrepresentative
Surveillance	The ongoing systematic collection, analysis, and interpretation of health data, essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know

ongoing national and some local surveillance activities. For example, mortality and cause of death statistics may be used to understand trends in disease and potentially identify risk factors for mortality. Likewise, morbidity statistics, for example, specific disease, health condition, or functional status descriptors, may be used for program planning purposes. Two publicly available, population-based databases, the *Census* and the *BRFSS telephone survey*, are described in more detail below. Sample uses of Census and BRFSS data are provided using Florida as a case state. In 2000, Florida's population was older than the national population, with 17.6% of the state age 65 years and older compared with a national proportion of 12.4%.[9] Because older adults are more likely to report a disability than younger adults or children, Florida's age structure has a significant impact on disability-related data.

The most useful data for planning are collected in a systematic and standardized manner and include information collected the same way over time to allow analysis of trends. There are 2 ways to use the resulting data: to estimate the actual number, or count, of persons of interest, or to estimate the percentage, or proportion, of persons of interest. For example, a rehabilitation professional, knowing some basic epidemiologic principles, could estimate the number of older adults with a disability in his or her area. However, this count is related to the total number of people in the area, so without a comparison group it may lose scale. North Dakota has a much smaller population than Florida, so the total number of older adults in North Dakota who need in-home services are likely to be much smaller than in Florida. But are the older adults in Florida at higher risk of disability and need for in-home services than older adults in

North Dakota? To more accurately answer this question, one may use a *proportion*, which is the number of people who need services divided by the number of people 65 years and older in the area. To demonstrate the utility of understanding disability at the "population" level, both methods are further considered below.

Census

The US decennial census normally is viewed as the source of *denominator* data for statistics on the health of Americans.[9] For example, when we calculate the incidence (number of new cases) of cancer in the United States in a given year, we may divide the number of new cases of cancer in the United States by the total US population, as calculated by the census. Data can be estimated for areas as small as census tracts, which typically include about 4000 people and are designed to be fairly homogenous. More commonly, estimates for zip codes or counties are of interest to answer more specific questions.

In Florida, Jackson et al recently summarized the 2000 Census data for disability by county among various age groups.[10] Figure 1 illustrates the prevalence (number of existing cases at a given point in time) of disability among Floridians 65 years and older by county of residence. On the 2000 Census, a series of questions in the sample characteristics, or so-called long form, queried respondents about disability of household residents, specifically their functional status, sensory impairment, and need for personal assistance.[11] These data provide minimal detail but more comprehensive coverage than most other data sources about the number and percentage of people who may have special needs. Thus, the benefit of understanding and using these data is that estimates are representative of the entire United States or smaller geographic areas of interest.

Using census data, disability in persons 65 years and older is assessed through 2 questions with 6 subcategories. A person who answers "yes" to any of these questions may be categorized as having a sensory, physical,
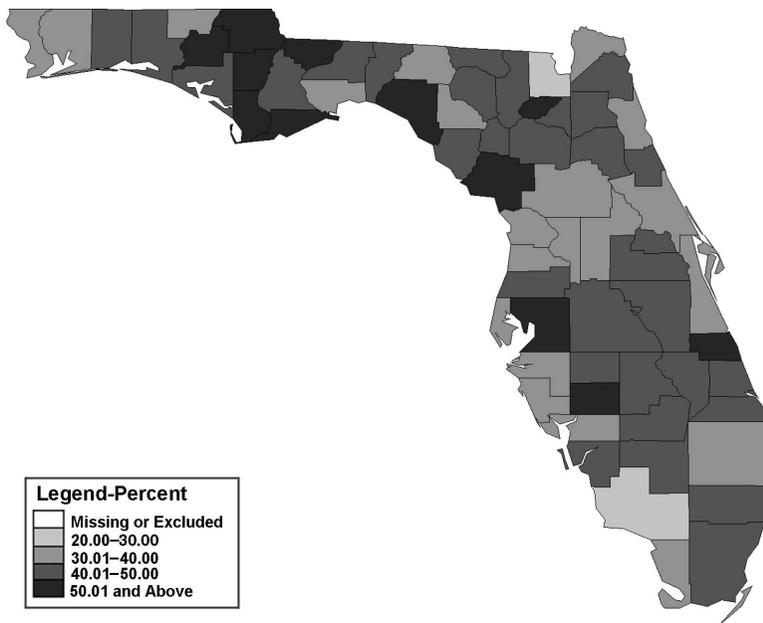

Figure 1. Prevalence of disability for persons 65 years and older in Florida counties, Census 2000. Persons 65 years and older are considered to have a disability on the basis of an affirmative response to 1 of 5 questions that are classified as sensory, physical, mental, self-care, or going outside the home disability.

Table 2. Disability among persons 65 years and older and county income characteristics in Florida's 5 most populous counties, Census 2000

County	Disability count	Disability prevalence, %	Households in poverty
Miami-Dade	132,409	45.5	14.5
Broward	104,696	41.1	8.7
Palm Beach	89,047	34.7	6.9
Hillsborough	51,061	44.0	9.1
Pinellas	77,925	39.0	6.7

mental, self-care, or going outside the home disability. On the basis of this Census definition of disability, Table 2 provides a comparison of the 3 Florida counties with the highest and the lowest proportion of people 65 years and older and with a disability. From this table, one can see that counties with the largest number of older adults with disability do not have the highest prevalence of disability. For rehabilitation professionals, this distinction may be important not only in program planning or in planning for accommodating potential clients but also in understanding the demographics of these potential clients. Table 2 indicates there may be more poverty in counties with a higher prevalence of disability. Knowing that older clients with a disability may face economic barriers to care may be useful to rehabilitation professionals. If a large proportion of clients live in poverty, it may be implied that the rehabilitation professionals (or office staff) should be familiar with programs available to these clients and be knowledgeable about services and enrollment criteria, particularly as related to transportation.

Behavioral Risk Factor Surveillance System

The *BRFSS* is the largest telephone surveillance survey in the world and is designed to collect reliable, ongoing estimates about a variety of health conditions and behaviors among the US population.[12,13] In 2006, the BRFSS surveyed 355,710 community-dwelling adults 18 years and older across the United States about a variety of health issues. Each state, territory, and the District of Columbia participates in the survey, which is supported by the Centers for Disease Control and Prevention (CDC) and administered at the state level. Thus, there are considerable differences in the number of surveys administered in each state, and some states choose to enhance their BRFSS samples and/or questionnaires. For example, in 2006, Washington State administered the largest number with more than 23,000 surveys whereas Alaska administered the smallest number, with 2113 surveys. The number of respondents, although large, generally is inadequate for statistically meaningful analysis of data at the county level. However, some BRFSS data on selected metropolitan areas are available, making the application or interpretation of the data more specific to the population at hand.[14] For more specifics on a state of interest, the reader is referred to the CDC's Web site or to contact the state's BRFSS office.[15]

As the name implies, the BRFSS queries Americans about their health and health habits, for example, smoking, exercise, and access to healthcare. Two questions have been used to measure disability since 2003: the prevalence of adults who are limited in any activities because of physical, mental, or emotional problems and the prevalence of adults who use special equipment, such as a cane or special telephone. The CDC typically reports disability for the United States on the basis of the percentage of adults who respond affirmatively to one or both questions.[16] Data are available online by state, for the nation (in summary form overall), and by demographic subgroups.[14] For example, based on

Table 3. Disability* among Florida adults 65 years and older from the 2005 Behavioral Risk Factor Surveillance System (BRFSS)*

BRFSS definition	Overall, % (count)	Among men, % (count)	Among women, % (count)
1. Limited in any activities because of physical, mental, or emotional problems	27.2	24.9	29.0
2. Health problem(s) that requires the use of special equipment	16.3	12.1	19.6
3. Limited in activities and/or use special equipment	32.7	28.7	35.8

*Weighted prevalence and counts.

2005 data, 6.2% of Americans said they used special (adaptive) equipment. From reports on standard metropolitan areas, the Miami—Fort Lauderdale—Miami Beach area reported a prevalence of adaptive equipment use of 5.8%, whereas for the entire state, the prevalence was 7.2%. By state, adaptive equipment use ranged from 4.6% among Colorado residents to 9.6% in West Virginia. Nationally 17.0% of adults 65 years and older reported they used adaptive equipment. Table 3 provides data for our case state of Florida in more detail. According to the BRFSS definition, nearly 1 in 3 older Floridians has a disability. Women have a higher prevalence of both activity limitations and adaptive equipment use than men and also have a higher prevalence of disability overall. Regardless of gender, activity limitation is more commonly reported than adaptive equipment use.

USING SURVEILLANCE DATA IN PRACTICE

The data sources and techniques described above can be useful to rehabilitation professionals interested in assessing the needs of their communities and in anticipating the needs of potential clients. By accessing these data sources on an annual basis, rehabilitation practitioners will be alerted to population trends (eg, increasing number of older adults in a region), emerging risk factors (eg, obesity as a risk factor for functional decline), and health conditions (eg, increase in incidence of diabetes in the ar-

eas with a high prevalence of obesity). The clinical utility of the above mentioned data is great, and data are publicly available, often in calculated table format, and searchable by county or other subdivision on the sponsoring agency's Web site. Rehabilitation professionals may need to extend their tool set to understand epidemiological concepts and may need to enhance their skill set to learn how to manipulate national databases for information retrieval. Alternately, they may choose to partner with an epidemiologist, biostatistician, or computer scientist to help with the comprehension and retrieval of these data. In the case of the BRFSS, states may also produce reports on topics of interest to geriatric rehabilitation professionals. In either case (Census or BRFSS), the internal database managers are available to answer specific questions.

CONCLUSION

In this article we have attempted to address the applicability of public health or epidemiological data (disability, aging, numbers, rates, prevalence, and incidence of health conditions) to rehabilitation professionals. Census and BRFSS data were discussed and we have illustrated why and how rehabilitation professionals can use these available data sets. By using these population-based data sets, rehabilitation professionals may more accurately identify potential client markets, plan for services, and develop programs on the local, regional, or national level. The authors argued

that when using a public health approach and epidemiological data, rehabilitation professionals might be better positioned to address the needs of the retiring baby boomers or the increasing disability-related demands of the older adult group in the US population.

An explanation of the applicability of the Census and BRFSS provided practical knowledge on the use of population-based data for the rehabilitation professional. Explanations were elucidated with resources (eg, Web sites) and methods (eg, partnering with an epidemiologist) to access data. Therefore, this avenue—understanding and using population-based data—creates plausible practice and research opportunities for rehabilitation professionals, especially in estimating and addressing the emergent age- and disability-related needs of the population.

Thus, whereas public health and rehabilitation professionals' fields may have developed relatively independently, there is ample opportunity for collaboration, education, and ultimately enhancing service delivery. Finally, the authors invite other healthcare professionals to consider working with public health professionals, to consult with an epidemiologist on a practice area of importance, or to make sense of a national data set for future service delivery and to report on these issues showing the natural fit between public health and rehabilitation professionals. In this way (working together in a multidisciplinary fashion) we can coordinate skill, knowledge, and expertise between public health and rehabilitation professionals to answer the charge of the IOM report in asking: "Who will keep the public healthy?"

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