Research in Nutrition and Dietetics—What Can the Academy Do for You?

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RESEARCH IS KEY TO achieving the Academy of Nutrition and Dietetics' mission and vision, as well as maintaining the evidence base for the profession of dietetics. Multiple research methods can be used to create and synthesize the data needed for moving the practice and profession forward. This report from the Research, International, and Scientific Affairs team at the Academy outlines five research models that can be applied to dietetics with the goal of decreasing the perceived difficulty of research and highlighting the numerous research resources provided by our team and others at the Academy.

Previous research has indicated that the reasons dietetics practitioners believe they are unable to participate in research include lack of time or staff support and a limited knowledge of research methodology.[1] Inclusion of research as an internship competency[2] may assist with the latter problem, but the former remains a concern. However, not all research must be time consuming. The purpose of this narrative is to compare and contrast five models for conducting research relevant to dietetics—translational, epidemiologic, practice-based, quality improvement, and evidence analysis. A special emphasis is placed on the practicality of research, including time required and supportive resources provided by the Academy.

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TRANSLATIONAL RESEARCH

Translational research is perhaps the most traditional research model. As illustrated by the downward arrow in the Figure, translational research usually begins in a theoretical, academic setting and moves from a cellular level laboratory investigation through animal and human trials into patient care. Translational research can be divided into two time frames: translation 1 (T1), which moves from a laboratory through clinical trials, and translation 2 (T2), which implements the practice in all settings, from academic medical centers to the community.[3,4] For example, the development and testing of a new drug is T1 research.[4] Finding effective ways of ensuring that the drug reaches the patients who need it is an example of the T2 step.[3] Translational research is an important method for understanding a disease or intervention from the mechanistic level through the practical level. However, it is time consuming on a day-to-day basis and on a time-to-use basis. The estimated average time lag from research to widespread practice is 17 years, although this is difficult to quantify due to variability in studies and in the time points measured to determine the lag.[4] Some data suggest the 17-year figure is the amount of time for translation of 14% of discoveries.[5] Translational research is also extremely expensive and generally must be supported by a large grant. Because the goal of T1 research is determining efficacy of a drug or intervention, studies take place in a highly controlled environment.[3] The use in daily practice of the results can be limited because of the carefully selected population for the study and the tightly controlled study conditions.[5]

Practitioners may be able to become involved in translational research if their facility has a clinical trial that needs a registered dietitian nutritionist or study coordinator, and a seasoned coordinator may become a study's principal investigator. Although translational research and recruiting for clinical trials is not the main goal of a Practice-Based Research Network (PBRN),[5] the Academy can support translational research at the clinical trials level through the Dietetics Practice-Based Research Network (DPBRN). The DPBRN can recruit practitioners who are interested in having their facilities participate as a site in a specific clinical trial.

EPIDEMIOLOGIC RESEARCH

Epidemiologic research is also a research model that traditionally stems from an academic setting. Epidemiology focuses on tracking individuals over time (either forward or backward) to determine what environmental exposures or lifestyle choices affect their health or disease course.[6] Individuals are recruited with a primary outcome in mind; significant amounts of data are collected to adjust for various factors that might impact the main outcome.[6] Generally this is a purely observational research—differences in groups would be due to individual choices not to randomization.[6] However, some intervention trials may go on to have a large epidemiologic observational follow-up component. Like translational research, epidemiology is expensive and time consuming, especially given the work to track people over time and prevent large numbers of subjects from dropping out before follow-up is complete.[6] Epidemiologic research also has gaps when it is time for application into practice, as the observational relationships found in epidemiology are correlations and do not prove causation.[6] It is critically important that relationships observed in epidemiologic studies are tested as interventions in further research instead of being translated directly into practice. There are many examples of studies in which correlations observed in epidemiologic studies were not observed when implemented as

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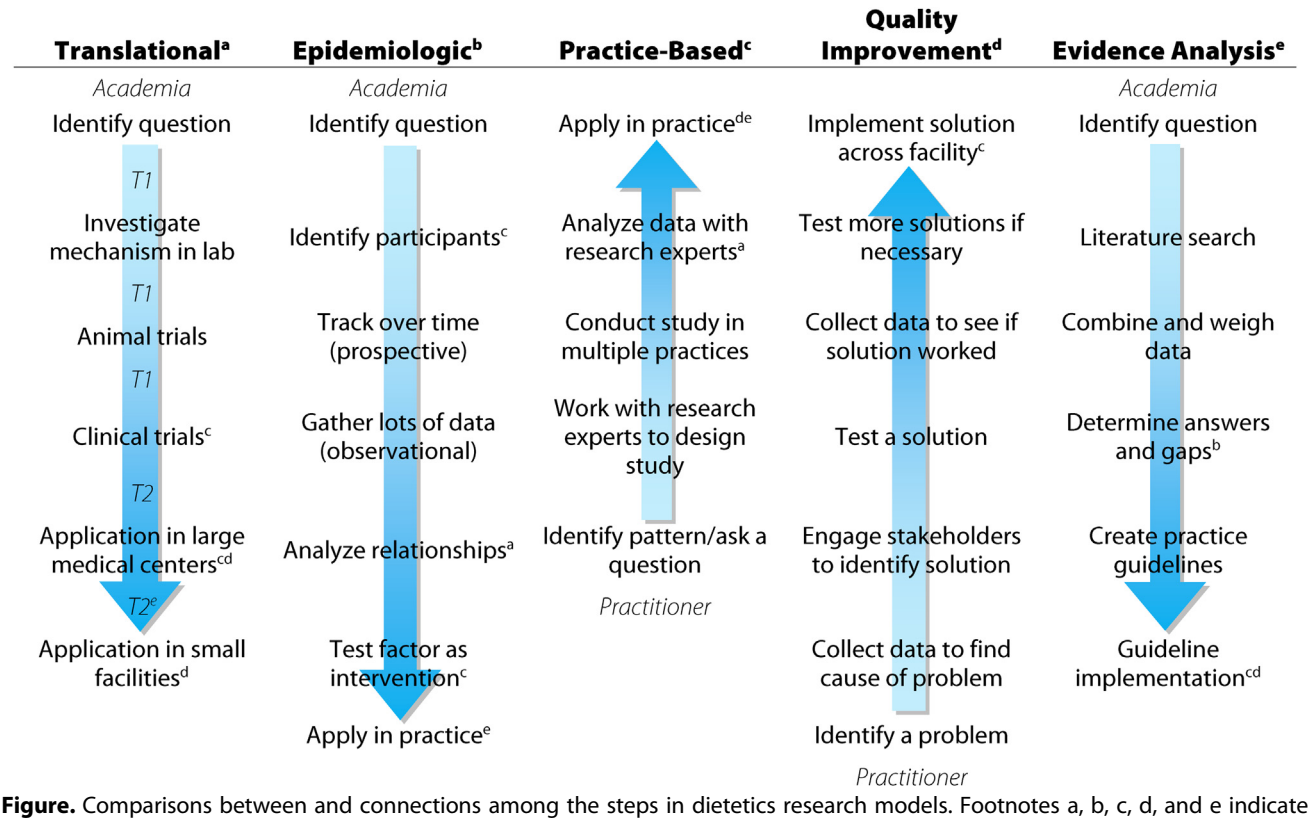

Figure. Comparisons between and connections among the steps in dietetics research models. Footnotes a, b, c, d, and e indicate transition points between different research methods, each of which has the associated footnote in its header row. For example, "Application in large medical centers[cd]" means that application of the findings of translational research may spur a practice-based research project to determine the effectiveness of the finding in a wider population than was used in a clinical trial, or might be supported by a quality improvement project investigating implementation strategies. Footnote e for Evidence Analysis indicates specifically where in the process a guideline might be developed and implemented. T1=translation 1; T2=translation 2.

interventions. An example of this phenomenon is found in the Heart Outcomes Prevention Evaluation [HOPE] trials that tested vitamin E supplements for the prevention of cardiovascular disease and cancer based on epidemiologic studies showing an inverse relationship between α-tocopherol consumption and rates of these diseases.[7] Results of the intervention indicated that vitamin E supplementation did not decrease the risk of cardiovascular disease or cancer and may increase risk of heart failure.[7] Although this does not disprove the epidemiologic relationships, it illustrates the importance of testing interventions based on correlations before making the intervention standard practice.

Practitioners might be involved in recruiting patients for epidemiologic studies, but it is more common for recruitment to be conducted by academic research groups. The Academy is developing a patient data registry that may be useful for supporting epidemiologic research in the future: the Academy of Nutrition and Dietetics Health Informatics Infrastructure (ANDHII). Members of the Academy will be able to use this registry to electronically submit deidentified patient data to a national registry of patient care records. The goal is to track patients over time and examine the impact of their nutritional care on changes in outcomes. Well-known examples of epidemiology in nutrition and dietetics include the Framingham study, the Bogalusa Heart Study, and the Nurses' Health Study.[6] Examples of epidemiologic research from the June 2013 issue of the *Journal of the Academy of Nutrition and Dietetics* include the exploration of Rink and colleagues[8] on the impact of fruit and vegetable consumption on oxidative stress biomarkers, and the article by Li and colleagues[9] on phytochemicals and lipid profiles in Chinese adults.

PRACTICE-BASED RESEARCH

Practice-based research attempts to fill some of the gaps in epidemiology and translational research by increasing the speed with which the research occurs and its applicability to practice.[5] Practice-based research at its best is a more grassroots approach to research, with practitioners in the field recognizing the questions that are important to be answered,[5] as demonstrated by the up arrow in the Figure. In contrast to translational research, practice-based research tests the effectiveness of a drug or intervention by studying it in the environment in which most patients receive their care.[5] Practice-based research is often organized and carried out by networks of clinicians or PBRNs. Clinicians ask the questions and work to develop a research protocol with research experts. Because each clinician likely does not have the patient load or time to complete a rigorous study on his or her own, clinicians from the network are recruited to take part in the study.[10] Each clinician researcher carries out the study in a small sample of his or her patients, which is then combined with other

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