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DIABETIC Medicine

COMMENTARY

Accelerating diabetes innovation for real-world community impact through interdisciplinary research: Who is at the table?

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Diabetes represents a range of conditions characterised by hyperglycaemia, impacting β-cell function and insulin action, and requiring daily self management in the form of tailored pharmacological and behavioural interventions. This heterogeneity is further compounded by the broad spectrum of acute and chronic diabetes-related complications which may compromise the function of every organ in the body and, ultimately, impact quality and quantity of life. It is therefore not surprising that generating innovative solutions to support the physical, emotional and social well-being for people living with diabetes is correspondingly complex and cannot be addressed successfully by a single academic discipline.[1] This commentary article represents a call to action for comprehensive interdisciplinary diabetes research to become the standard to accelerate diabetes innovation and realise research advancements into 'real-world' community impacts. The authors are members of the

*Lived experience authors.

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Australian Centre for Accelerating Diabetes Innovation (ACADI)—a collaborative interdisciplinary national diabetes centre uniting over 70 different partners, including academic, advocacy, health service, industry and community partners. Importantly, the authors represent diverse disciplines (Figure 1) and lived experience (of gestational diabetes, EHT; and type 1 diabetes, MR).

While there is a substantial body of work dedicated to the meaning of *interdisciplinary research*,[2] for this commentary, it is defined as the integration of knowledge, techniques and perspectives 'from two or more disciplines to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline'.[3] Interdisciplinary diabetes research offers several benefits. Combining different areas of expertise and innovative thinking is of central influence in scientific achievements and breakthroughs.[4] Interdisciplinary research can bring novel insights, overcome feasibility or logistical constraints by pooling available resources to increase capacity and enhance complexity and sophistication of research outputs.[5] Thus, interdisciplinary research can reduce duplication, and ensures that the best approach and methods are used to assess outcomes, thereby increasing the appropriate allocation and efficient use of research funding to the needs and priorities of diverse communities.

Methodologies and frameworks have been developed specifically to assist researchers to engage in and understand the process of interdisciplinary research,[6] including making disciplinary perspectives explicit to assist mutual understanding.[7] Figure 1 provides a high-level outline of a range of disciplines (and example disciplinary questions) that can contribute to the diabetes research table to increase the likelihood of translating research outcomes into real-world community impact. The list of disciplines in Figure 1 is not exhaustive, and their involvement should be informed by the specific aims of the research being conducted. Not surprisingly, there are overlapping questions across disciplines featured in Figure 1, highlighting the inherent interdisciplinary nature of diabetes research. Interdisciplinary research demands shared understanding and collaboration—the action of connecting or interacting among disciplines—with valuable learnings drawn from 'team science', which (though not necessarily interdisciplinary in nature) focusses on understanding interpersonal processes and managing circumstances that facilitate or hinder effective collaborative research.[8] Yet, a critical review of the literature indicates that interdisciplinary research has largely not been implemented in a way, which optimises collaboration.[2]

An international e-Delphi study conducted to identify priorities for methodological research in behavioural trials emphasised the importance of specifying intervention components (drawing on behavioural sciences), tailoring interventions to specific populations and contexts (enabled through community involvement) and consideration of methods to ensure interventions are implementable into practice and policy (drawing on



FIGURE 1 Interdisciplinary scientific, clinical and lived experience expertise supporting real-world impact.

implementation sciences).[9] Drug and device human research trials are similarly strengthened by the involvement of lived experience, behavioural and implementation science expertise. For instance, each contributing expertise, in collaboration with biomedical and clinical researchers, health economists and biostatisticians, can support the identification of relevant primary, secondary and process evaluation outcomes to support a holistic understanding of intervention effects, acceptability, scalability and the associated mechanisms of each. However, in practice, such opportunities are not being realised. For example, in the past 5 years, less than 50% of registered randomised controlled trials (RCTs) in people with type 1 and/or type 2 diabetes of all ages included person-reported outcome measures (PROMs)—for drug trials, only 20% included PROMs.[10] Further, a 30-year systematic review highlighted that qualitative methods are underutilised in understanding the diabetes experience, particularly among non-clinical populations and lower income countries.[11] There are also renewed calls for greater focus on the implementation of effective research approaches to diabetes prevention and care in 'real-world' settings.[12] To inform our approach, we can look to recent examples of large-scale interdisciplinary diabetes research that have paved the way forward,[13–16] such as GP-OSMOTIC (examining primary-care based professional-mode flash glucose monitoring in type 2 diabetes)[14,15] and DAFNEplus (an update and evaluation of a type 1 diabetes structured education program),[13] both of which involve(d) collaboration between clinical researchers, implementation specialists, behavioural scientists, biostatisticians, epidemiologists and health economists. If the ultimate goal of diabetes research is real-world translation, then studies such as these illustrate the need for and benefits of input and integration of diverse disciplines.

There are both institutional and practical barriers to interdisciplinary collaboration. These include academic tradition, which structures research in discipline 'silos',[17,18] reinforced by competitive research funding pathways and awards that perpetuate single discipline approaches through significant focus on individual (rather than collaborative) track records and contributions, as well as peer review by researchers in the same discipline.[19] Uncertainties also remain as to how interdisciplinary diabetes research can be sustainably managed, evaluated and rewarded,[20] which is further compounded by an environment where funding is not commensurate with the prevalence, associated complications and severity of the condition, not to mention healthcare costs.[21] An interdisciplinary approach may assist in raising collective awareness of the breadth of challenges faced by the person living with diabetes and promote the urgent need for research, and associated funding, in this area.

There is a need for dissemination and promotion of best practice models for interdisciplinary diabetes research or case studies akin to what has been achieved in interdisciplinary education, professional training and clinical care.[22] A recent systematic review on empirical strategies for enabling interdisciplinary collaborations (across research sectors) noted internal grant opportunities, networking events to build connections amongst researchers from different disciplines (including online forums) and well-funded independent interdisciplinary research institutes as key facilitators for success.[2] Outside the diabetes research sector, practical guides and educational training programs to promote interdisciplinary research have been developed[23] and research has explored barriers and enablers of interdisciplinary engagement to better understand and develop appropriate strategies to mitigate challenges.[24]

How can the diabetes research sector move forward to promote interdisciplinary collaboration? Commitment and collaborative leadership from researchers, research funding bodies and publishing bodies will be critical.[2] Mechanisms are needed to facilitate interactions and collaborations between researchers working in diverse fields. This may be facilitated through interactive diabetes conferences, funding schemes that place greater weight on interdisciplinary research and publications showcasing interdisciplinary research approaches to solve complex challenges in diabetes prevention, care and management. Complementing these mechanisms, there needs to be multiple pathways and greater support systems that appropriately resource interdisciplinary collaboration, including conducive employment frameworks, resources and training.[25] This is particularly important in the context of supporting early and mid-career diabetes researchers to pursue interdisciplinary collaborations and the meaningful involvement of people with lived experience in research.

Incremental change must be encouraged to realise and benefit from interdisciplinary diabetes research as the standard approach. An important first step is for diabetes researchers, of all disciplines, to consider 'who' has a seat at their diabetes research table.

AUTHOR CONTRIBUTIONS

EHT conceived of the commentary scope and, together with JJ, prepared a first draft of the manuscript. All authors contributed to manuscript revisions and approved the final version.

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