Current research priorities for diabetes in health services and systems research

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Agenda

Background → Research Questions → Methods & Results → Conclusions
Diabetes prevention and control is critical

~10.5% of US population\(^1\)

Vast majority Type 2 diabetes\(^1\)

Morbidity and mortality implications\(^1\)

Total costs >$300 billion\(^2\)

(1) US Centers for Disease Control and Prevention 2020; (2) American Diabetes Association, 2017
Using the HSRproj dataset…

1. What are the top funding sources for contemporary diabetes research?

2. What are the research priorities of funded diabetes research projects?
Identify 250 recent research projects

Assess top funders (RQ1)

Identify top research priorities (RQ2) (two methods)

- Alignment with social-ecological model and funding amounts
- Common research themes using MeSH terms and network analysis

All data, code, and documentation available on GitHub
Identify 250 recent research projects

1. Download 900 US projects containing *Diabetes Mellitus* MeSH term from 2002-present
2. Exclude non-research projects (n=231)
   - Training, conferences, infrastructure
3. Sort by initial year and month of project
4. Keep most recent 250

MeSH = Medical Subject Heading
Identify 250 recent research projects

Assess top funders (RQ1)

1. Extract funder information from HSRproj text input
2. Descriptive statistics
NIH is the primary funder of diabetes research

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIH</td>
<td>152</td>
</tr>
<tr>
<td>VA</td>
<td>35</td>
</tr>
<tr>
<td>AHRQ</td>
<td>27</td>
</tr>
<tr>
<td>PCORI</td>
<td>21</td>
</tr>
<tr>
<td>CDC</td>
<td>10</td>
</tr>
</tbody>
</table>

Results: top funding sources
NIH is the primary funder of diabetes research

NIH = National Institute of Health

NIDDK = National Institute of Diabetes and Digestive and Kidney Diseases

NHLBI = National Heart, Lung, and Blood Institute

NIA = National Institute on Aging

NINR = National Institute of Nursing Research

NIMHD = National Institute on Minority Health and Health Disparities
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Alignment with social-ecological model and funding amounts

Common research themes using MeSH terms and network analysis
Identify 250 recent research projects

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Alignment with social-ecological model and funding amounts

Common research themes using MeSH terms and network analysis

1. Classify studies
2. N and average funding within each group
3. Visualize

Sallis, Owen, & Fisher, 2015
Figure 1: Distribution of average yearly funding of included projects

The majority of projects focused on individual and interpersonal factors, and on average, those projects received more funding.

Policy
avg = $332,784  n=14

Organizational & Community
avg = $312,060  n=45

Individual & Interpersonal
avg = $413,879  n=158

Notes: Numeric results should be interpreted with caution - 77% (192/250) projects were included. Figure excludes 58 projects where the social ecological model was not applicable (n=23) and/or funding information was not available (n=39; primarily Veteran’s Administration projects). If a study targeted more than one level (e.g., a multilevel diabetes self-management intervention), average yearly funding is divided equally among levels. Projects were classified into levels of the social-ecological model by study team members. One researcher classified all 250 studies, two researchers each reviewed a random 10%.

Median funding amounts: $341,111 (indiv/inter), $284,134 (org/comm), $448,104 (policy).
Identify 250 recent research projects

Assess top funders (RQ1)

Identify top research priorities (RQ2) (two methods)

1. Simplify and combine MeSH terms into concepts
2. Create concept network
3. Identify sub-groups of highly connected concepts
4. Visualize

Alignment with social-ecological model and funding amounts

Common research themes using MeSH terms and network analysis

Reichardt, 2007
Figure 2: Diabetes research themes

Themes were created using a network of linked MeSH terms and parsing highly-connected groups of terms using network analysis.

Notes: T1D = type 1 diabetes. T2D = type 2 diabetes. Concepts displayed are aggregated MeSH terms. Each MeSH term must have occurred in at least two projects. To be linked, those concepts must have appeared in the same project at least four times. Research themes were derived using the springglass community detection algorithm in R. Related communities were combined to form five cohesive research themes. Linkages between MeSH terms not shown for interpretability. Dots represent MeSH concepts. Text labels for MeSH concepts are arranged to prevent overlap and are connected to their specific dot/MeSH concept with lines when necessary.
Conclusions

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National Institutes of Health major funder

Particularly National Institute of Diabetes, Digestive, and Kidney Diseases

Policy, organizational, and community factors may be under-studied, relative to potential impact

Focus on novel combinations of concepts
Thank you!

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Key References

This figure displays the groupings that were aggregated to create larger research themes. Aggregation occurred in the red and blue themes and subgroups are shown in shades of red or blue, respectively.

Notes: T1D = type 1 diabetes. T2D = type 2 diabetes. Concepts displayed are aggregated MeSH terms. Each MeSH term must have occurred in at least two projects. To be linked, those concepts must have appeared in the same project at least four times. Research themes were derived using the springglass community detection algorithm in R. Related communities were combined to form five cohesive research themes. Linkages between MeSH terms not shown for interpretability. Dots represent MeSH concepts. Text labels for MeSH concepts are arranged to prevent overlap and are connected to their specific dot/MeSH concept with lines when necessary.