Abstract

Discordance between physicians and patients’ health beliefs can impede health communication efforts, particularly for preventable diseases like type 2 diabetes. However, little research considers physicians’ perceptions of patient beliefs, despite the importance of perceptions in shaping communication. This work identifies instances of actual and perceived discordance between physicians and patients’ beliefs regarding the causes and controllability of type 2 diabetes. We surveyed 229 family physicians about their health beliefs and perceptions of their patients’ beliefs, and their responses were contrasted against beliefs from a national sample of 1,168 U.S. adults. Paired and independent sample t-tests assessed whether (a) physicians’ beliefs diverged from the national sample’s beliefs (actual discordance), (b) physicians perceived their health beliefs to diverge from their patients’ beliefs (perceived discordance), and (c) physicians’ perceptions of their patients’ beliefs diverged from the national sample’s beliefs (accuracy of perceived discordance). Findings revealed that although physicians’ perceptions of patients’ beliefs were accurate in some instances, physicians generally overestimated discordance. Therefore, although physicians perceived discordance between their own and their patients’ beliefs, data from a national survey suggested that these gaps are less substantial than physicians expect. We discuss implications of real and perceived discordance for effective health communication and education.

Keywords: doctor-patient relationships; health communication; health beliefs; type 2 diabetes; perceptions; patient education
Real and Perceived Discordance in Physicians and U.S. Adults’ Beliefs Regarding the Causes and Controllability of Type 2 Diabetes Mellitus

1. Introduction

Type 2 diabetes is a growing epidemic that manifests largely due to modifiable lifestyle risk factors, including physical inactivity and poor nutrition habits. Recent estimates suggest that type 2 diabetes currently affects 30.3 million people in the United States, and an additional 84 million Americans are estimated to have pre-diabetes (American Diabetes Association, 2017). Given the role of modifiable lifestyle risk factors, as well as the physical, psychological, and financial costs associated with developing type 2 diabetes, many interventions specifically target people who have diabetes risk factors, but have not yet developed diabetes, in order to prevent diabetes onset (Ackermann, Finch, Brizendine, Zhou, & Marrero, 2008; Albright & Gregg, 2013; Diabetes Prevention Program Research Group, 2002). However, these efforts may be impeded if patients’ beliefs regarding the development of diabetes diverge from physicians’ beliefs (Ogden et al., 2001; Starfield et al., 1981). Moreover, efforts to communicate with patients may be further impaired if physicians’ expectations of patients’ beliefs, which are often used to shape conversations about prevention and treatment recommendations, differ from patients’ actual beliefs (Street, Gordon, & Haidet, 2007; Van Ryn & Burke, 2000). Therefore, the growing prevalence of type 2 diabetes, as well as the consequences associated with inadequate physician-patient communication, underscore the importance of mitigating factors that may impede physicians’ ability to effectively educate patients about diabetes treatment and prevention. The current report aims to investigate actual and perceived gaps in physician-patient beliefs that may undermine health communication and subsequently, diabetes prevention, in the United States.
Substantial research examines instances of discordance by directly comparing physicians and patients’ health beliefs; however, little work considers how physicians’ perceptions of patient beliefs may contribute to the development of these gaps (Bleich, Huizina, Beach, & Cooper, 2000; Colgan et al, 2015; Schwarze, Sayla, & Alexander, 2007). Thus, the interventions needed to effectively manage diabetes may be best informed by examining physicians and patients’ health beliefs alongside the health beliefs physicians perceive their patients to hold.

Understanding physicians’ perceptions of patient beliefs is critical because these expectations can shape patient interactions (Van Ryn, Burgess, Malat, & Griffin, 2006). Specifically, perceptions may directly impact the methods used to communicate with patients, the types of conversations that physicians engage in, and the recommendations offered for prevention or treatment. For example, physicians who overestimate patients’ health literacy may fail to address gaps in understanding or utilize jargon that can reduce patients’ accessibility to health knowledge (Kelly & Haidet, 2007). Moreover, the accuracy with which medical students perceive nonverbal behavior can directly impact their communication behaviors (e.g., posture, nodding, and speech fluency) and rapport with patients (Hall, Blanch, Roter, & Frankel, 2009). Additionally, the (in)accuracy of physicians’ perceptions can directly impact their clinical performance; for instance, physicians who misperceive patients’ health knowledge may be more likely to undertreat patients or make treatment decisions that are inconsistent with patients’ goals (Hall et al., 2014; Platt & Keating, 2007; Street & Haidet, 2011). Therefore, prior research suggests that perceiving discordance may be just as consequential as instances of actual discordance for health communication. However, limited research-to-date has investigated this possibility.

In the context of type 2 diabetes, prior research has identified instances of discordance between physicians and patients’ treatment goals, preferred treatment strategies, perceived
barriers to diet and exercise, and perceived adherence to treatment recommendations (Boyer et al., 1996; Du Pasquier-Fediaevsky & Tubiana-Rufi, 1999; Freeman & Loewe, 2000; Heisler et al., 2003; Shultz, Sprague, Branen, & Lambeth, 2001). However, limited research focuses on discordance between physicians and patients’ beliefs regarding the (a) causes, and (b) controllability of diabetes, despite the importance of these beliefs for health communication and diabetes prevention (Coronado, Thompson, Tejeda, & Godina, 2004; Hatcher & Whittemore, 2007).

Although little research has examined health beliefs about the causes and controllability of type 2 diabetes, previous research has documented the implications of these beliefs for other health conditions (e.g., obesity). For instance, prior research shows that physicians’ perceptions about the causes of smoking and obesity impact whether they communicate related health risks to patients, as well as the types of treatments they choose to discuss (Ogden & Flanagan, 2008; Thompson, Schwankovsky, & Pitts, 1993). Moreover, other research shows that when physicians believe their patients’ health status is caused by lifestyle factors, they may be less likely to discuss and provide guideline-concordant care (Ding et al., 2005; Phelan et al., 2015).

Patients’ health beliefs about the causes and controllability of health conditions can also directly impact their health behavior (Fishbein, 1980; Hochbaum, Rosenstock, & Kegels, 1952). Goodwin and colleagues (1999) find that when people attribute their health conditions to natural aging, they are less likely to have had regular physician visits or received preventive medical services than people who do not attribute their health conditions to age-related causes. Furthermore, stronger beliefs about disease controllability can facilitate patients’ attention to disease-relevant health information, increase engagement in self-directed screening behavior (e.g., breast self-exams), and increase self-monitoring behavior (Bundek, Marks, & Richardson,
Moreover, beliefs about controllability are associated with several other important patient outcomes, such as compliance with treatment recommendations, utilization of health care services, decision-making, and disease incidence (Fishbein & Cappella, 2006; Godin & Kok, 1996; Korin et al., 2013). Therefore, given empirical work showing that physicians and patients’ health beliefs have important implications for subsequent communication and behavior, it is just as critical to consider (a) physicians’ perceptions of patients’ health beliefs, and (b) the accuracy of these perceptions, for disease prevention efforts.

The current report examines beliefs about the causes and controllability of type 2 diabetes by comparing and contrasting (a) physicians’ beliefs, (b) physicians’ perceptions of their non-diabetic patients’ beliefs, and (c) beliefs from a national sample of U.S. adults without diabetes. This study focused specifically on beliefs for people without diabetes to identify the ways in which physicians’ perceptions may shape preventive care. In particular, this study examined the extent to which (1) physicians’ beliefs diverge from the general public’s beliefs, (2) physicians perceive their health beliefs to diverge from their patients’ beliefs (e.g., by rating patients’ beliefs differently from their own), and (3) physicians’ perceptions of patients’ beliefs diverge from the general public’s beliefs. These comparisons have important implications for health communication and prevention efforts; identifying actual instances of belief discordance is critical for directing patient education and communication to increase concordance and improve patient outcomes (Coran, Koropeckyj-Cox, & Arnold, 2013). Physicians’ perceptions of patient beliefs, however, may influence where physicians believe the starting point for these conversations are; specifically, physicians may tailor patient education based on what they believe patients know, rather than what patients actually know.

2. Method
2.1. Physician Recruitment

After obtaining approval from the Institutional Review Board, an online Qualtrics survey was embedded in a monthly newsletter and disseminated to family physicians through the American College of Osteopathic Family Physicians (ACOFP) email listserv between December 2016 and January 2017. A reminder email was sent to the listserv two weeks after the initial invitation, and survey collection ceased the week after no new responses were collected. Family physicians who managed the care of patients with diabetes were recruited because they have sufficient knowledge of the disease course, as well as how to treat and prevent diabetes.

2.2. Physician Sample

2.2.1. Participants

229 physicians completed the survey and were included in the final sample (see Table 1 for physician demographics).

2.2.2. Measures

Physicians were told that the study assessed their health beliefs and methods for communicating information about type 2 diabetes to non-diabetic patients. The survey focused on non-diabetic patients to understand how physicians perceive the health beliefs of patients for whom preventive care is most impactful. As such, comparing beliefs between physicians who manage diabetes and non-diabetic adults may be most informative for preventive care because physicians who are knowledgeable about the prevention, development, and treatment of diabetes are continuously engaging non-diabetic adults to address modifiable risk factors and prevent the onset of diabetes. Survey items were derived from the survey conducted for the national sample of U.S. adults.

Physicians’ Health Beliefs
Physicians reported their beliefs about (a) the causes of type 2 diabetes (4 items; e.g., In general, how much is a patient’s chance of getting type 2 diabetes due to what he/she eats; 1, Not at All; 6, All), and (b) the controllability of type 2 diabetes (3 items; e.g., A person with type 2 diabetes will have this illness for the rest of his/her life; 1, Strongly Disagree; 5, Strongly Agree).

Physicians’ Perceptions of Patient Beliefs

Physicians reported their perceptions about their patients’ beliefs regarding (a) the causes of type 2 diabetes (4 items; e.g., How much do your non-diabetic patients believe their chance of getting type 2 diabetes is due to what they eat; 1, Not at All, 6, All), and (b) the controllability of type 2 diabetes (3 items; e.g., How much would a non-diabetic patient agree with this statement: Someone with type 2 diabetes will have this illness for the rest of their life; 1, Would Strongly Disagree; 5, Would Strongly Agree). The content reflected in these survey items matched the items assessing physicians’ own health beliefs.

2.3. National Sample

Data from a national sample of non-diabetic adults was used as a comparison group against physicians’ responses. Using a national sample highlights the wide-ranging and diverse beliefs that may be encountered by physicians, increasing generalizability of findings to other U.S. samples and clinical settings.

2.3.1. Participant Recruitment

The presented data is based on an analysis of selected variables from the Genetic Explanations for Type 2 Diabetes: Prevention Implications project, which focused on respondents' beliefs, attitudes, and behaviors related to obesity and type 2 diabetes. The study was approved by the Health and Behavioral Sciences Institutional Review Board. Professionally trained interviewers obtained informed verbal consent and conducted structured telephone
interviews with participants through list-assisted, random-digit-dialed, landlines selected by a computer between August 2011-February 2012.

2.3.2. Survey Participants

This national survey included a sample of 1,168 non-diabetic U.S. adults aged 18-75 who self-identified as non-Hispanic Black (n=387), non-Hispanic White (n=396), or Mexican American (n=385; see Table 1 for demographics). Inclusion criteria were individuals within the 48 contiguous states of the U.S. (excluding Hawaii and Alaska) who (a) self-identified as non-Hispanic White, non-Hispanic Black, or Mexican American, (b) were between the ages of 18 and 75, and (c) did not have a diagnosis of any kind of diabetes, excepting a history of gestational diabetes. Due to the main study’s focus on diabetes prevention, all participants were screened for non-diabetic status (“Have you ever been told by a doctor or health professional that you had diabetes?”). Data were weighted to be nationally representative of the targeted ethnic and racial groups. For the sake of brevity, additional information regarding recruitment and creation of the sampling weights are reported in the online supplement (Appendix A).

2.3.3. Measures

To assess the general public’s beliefs about the causes and controllability of type 2 diabetes, participants answered survey items identical to those used in the physician survey about (a) the causes (4 items), and (b) the controllability of developing type 2 diabetes (3 items).

Complete wording for all survey items is reported in the online supplement (Appendix B).

2.4. Statistical Analysis

During data cleaning, 31 participants were dropped from analysis due to ineligibility (diabetic status: n=4; race/ethnicity status: n=27)
Physician survey data were analyzed using SPSS (version 24.0). Because data from the national sample used complex sampling weights, weighted means and standard errors were obtained using Stata (version 14.2). Paired t-tests compared physicians’ health beliefs with their perceptions of their patients’ beliefs, and independent samples t-tests compared the national sample’s health beliefs with (a) physicians’ beliefs, and (b) physician’s perceptions of patient beliefs. Paired t-test comparisons were analyzed in SPSS, and independent samples t-test comparisons were analyzed using an external t-test calculator. Means and standard errors for the following results are presented in Table 2, and effect sizes are reported as Cohen’s d.

In the survey conducted for the national sample, a small subset of participants volunteered responses (e.g., “I neither agree nor disagree”) that were incorporated into the dataset. We included these response options in the physician survey to directly match the range of responses reported by the national sample. However, given the disproportionately higher rates at which physicians chose these “volunteered” responses, two adjustments were made at the data analysis stage. First, we collapsed across “Almost All” and “All” (a volunteered response), and second, we dropped any responses of “Neither agree nor Disagree” (a volunteered response). The adjusted survey response scales are reported in Table 2.

To mitigate concerns about the time lag in data collection between the physician and national surveys, we conducted a follow-up survey in September 2018 using 101 non-diabetic U.S. adults recruited online. Recruitment efforts sought to match the racial demographics of the national sample after sampling weights were applied. Analyses generally replicated the study findings, and any discrepancies are reported below. Additional information about this sample, including means and test statistics, are reported in the online supplement (Tables S1a-S1b).

3. Results
To assess beliefs about the causes and controllability of type 2 diabetes, comparisons were made at three levels: (a) physicians’ beliefs versus the national sample’s beliefs (actual discordance), (b) physicians’ beliefs versus physician’s perceptions of patients’ beliefs (perceived discordance), and (c) physicians’ perceptions of patients’ beliefs versus the national sample’s beliefs (accuracy of perceived discordance).

3.1. Perceived Causes of Type 2 Diabetes

3.1.1. Comparing Physicians’ Beliefs with the National Sample’s Beliefs

Physicians’ beliefs about the causes of type 2 diabetes generally diverged from the national sample’s beliefs (see Figure 1). Compared to physicians, the national sample was less likely to believe that the development of type 2 diabetes is due to genes (t(1386)=8.51, p<.001, d=.46). Moreover, when weighing the causes of type 2 diabetes to genetics versus lifestyle and health habits, the national sample attributed diabetes to lifestyle factors more than physicians (t(1373)=2.07, p=.040, d=.11). However, the national sample was also less likely than physicians to attribute the development of diabetes to diet and exercise (t(1385)=8.85, p<.001, d=.48; t(1388)=3.36, p=.001, d=.18). Collectively, findings suggest that although U.S. adults are more likely to attribute the development of type 2 diabetes to lifestyle factors (versus genetics) than physicians, there are significant gaps in understanding the role of specific behaviors that may constitute these lifestyle factors.

3.1.2. Comparing Physicians’ Beliefs with Their Perceptions of Patient Beliefs

Physicians perceived that their beliefs about the causes of type 2 diabetes strongly diverged from their patients’ beliefs. Physicians reported that, compared to themselves, their patients would be more likely to (a) believe that diabetes is caused by genetics (t(228)=-3.06, p=.002, d=-.21) (b) believe that diabetes is due more to genetics than to lifestyle and health
habit (t(227)=10.83, p<.001, d=.72), and (c) underestimate the role of diet and exercise in the development of diabetes (t(228)=10.58, p<.001, d=.71; t(228)=10.48, p<.001, d=.70). Thus, physicians generally believed that patients would overestimate the role of genetics, versus lifestyle factors, in the development of diabetes.

3.1.3 Comparing Physicians’ Perceptions of Patient Beliefs with the National Sample’s Beliefs

In direct contrast to physicians’ perceptions, the national sample was less likely to believe that genetics had a role in the development of type 2 diabetes (t(1386)=10.24, p<.001, d=.55), and was more likely to believe that diabetes is due to lifestyle and health habits than genetics (t(1372)=-11.98, p<.001, d=-.65). Although physicians accurately perceived patients’ beliefs regarding the role of diet in developing diabetes (t(1385)=-.34, p=.733, d=-.02), the national sample attributed the development of diabetes to exercise more than physicians expected (t(1388)=-6.14, p<.001, d=-.33). Therefore, although physicians perceived discordance between their own and patients’ beliefs, these gaps were not as substantial as physicians expected.

Although study results using the national sample showed a non-significant finding regarding the role of diet, findings using the online sample revealed a different pattern; when physicians’ perceptions of their patients’ beliefs were compared against the online sample, study means showed that the online sample attributed the development of diabetes to diet more than physicians expected (t(328)= 3.38, p<.001, d=.37).

3.2 Perceived Controllability of Type 2 Diabetes

3.2.1 Comparing Physicians’ Beliefs with the National Sample’s Beliefs

The national sample reported more fatalistic beliefs about diabetes than physicians (see Figure 2). As such, they were more likely to (a) agree that they could not avoid diabetes if it ran in one’s family (t(1376)=-6.23, p<.001, d=-.34), (b) believe that people with diabetes would have
the illness for the rest of their life (t(1338)=−3.20, p=.002, d=−.17), and (c) report having less control over developing diabetes (t(1391)=5.68, p<.001, d=.30). Taken together, these findings identify real, significant gaps between physicians and the general public’s beliefs about the controllability of type 2 diabetes.

3.2.2. Comparing Physicians’ Beliefs with Their Perceptions of Patient Beliefs

Physicians expected that patients would report more fatalistic beliefs about type 2 diabetes. Thus, physicians perceived that patients would (a) be more likely to agree that if diabetes runs in a person’s family, there’s not much they can do to avoid getting it (t(170)=−18.43, p<.001, d=−1.41), (b) report beliefs that people with diabetes would have the illness for the rest of their life (t(161)=−5.56, p<.001, d=−.44), and (c) underestimate how much control they have over the development of diabetes (t(228)=12.47, p<.001, d=.84). As such, physicians perceive their patients to hold more fatalistic beliefs about developing type 2 diabetes, consistent with the gaps that actually exist.

3.2.3. Comparing Physicians’ Perceptions of Patient Beliefs with the National Sample’s Beliefs

Although physicians accurately perceived the direction of patients’ beliefs about the controllability of type 2 diabetes, they generally underestimated the extent to which patients believe diabetes to be controllable. Responses from the national sample revealed that, compared to physicians’ perceptions, U.S. adults (a) were less likely to endorse beliefs that they cannot avoid diabetes if it ran in one’s family (t(1336)=10.73, p<.001, d=.59), (b) were less likely to endorse beliefs that people will have diabetes for the rest of their life (t(1342)=2.88, p=.004, d=.16), and (c) perceived greater control over the development of diabetes (t(1391)=−5.02, p<.001, d=−.27). Therefore, physicians perceived that the gaps in beliefs regarding the controllability of diabetes were larger than they actually are.
4. Discussion and Conclusion

4.1 Discussion

Although physicians are motivated to engage patients in high-quality communication to promote preventive care, prior research demonstrates that discordant health beliefs between physicians and patients can impede this aim, facilitating poorer patient outcomes (Meropol et al., 2003). The present work shows that physicians and U.S. adults report significant differences in their beliefs regarding the causes and controllability of type 2 diabetes. By examining another factor that may impact diabetes management, physicians’ perceptions of their patients’ beliefs, these findings also identify the extent to which physicians may be overestimating these gaps.

Therefore, the present research identifies two possible intervention points, physicians’ perceptions and patients’ beliefs, for improving health communication and diabetes prevention.

Across study measures, physicians perceived that their health beliefs regarding the causes and controllability of type 2 diabetes were strongly discordant from their patients’ beliefs.

Although the data comparing physicians and the national sample’s responses confirmed that these differences actually exist, analyses also revealed that physicians’ perceptions of patient beliefs were largely inaccurate in direction or degree. Although physicians perceived that their patients underestimate the role of lifestyle factors and overestimate the role of genetics in developing type 2 diabetes, responses from the national sample showed that U.S. adults actually attributed diabetes to lifestyle factors (versus genetics) more than physicians, and perceived genetics to have a smaller role than even physicians believed. Furthermore, although physicians overestimated the gap between their own and patients’ beliefs regarding the role of exercise in developing diabetes, physicians accurately perceived patients’ beliefs regarding the role of diet;
the national sample was less likely than physicians to attribute the development of diabetes to diet.

Additionally, although physicians were accurate about the direction of people’s responses regarding fatalistic beliefs about type 2 diabetes, they overestimated the degree to which their own beliefs diverged from their patients’ beliefs. Thus, compared to physicians’ perceptions, the national sample reported greater control over developing diabetes, were less likely to endorse the inevitability of familial diabetes, and were less likely to believe that someone with diabetes will have the condition forever.

Collectively, findings show that physicians’ perceptions generally led them to overestimate discordance between their own and patients’ beliefs across survey items. In the context of physician-patient communication, one direct implication of these presumptions is that physicians may expend more time than is necessary focusing on small gaps in health beliefs, which may detract from their ability to discuss health beliefs where there are more substantive gaps (e.g., the role of diet in developing diabetes). Moreover, overestimating discordance may discourage physicians from initiating conversations with patients if physicians expect that they will be unable to bridge gaps in beliefs, particularly when time is limited. Finally, overestimating discordance can increase patients’ perceptions that their voice is not being heard, which may result in more negative physician-patient relationships, increased stress, and worse adherence to treatment recommendations (Coran et al., 2013; Jagosh, Donald Boudreau, Steinert, Macdonald, & Ingram, 2011).

Considering the role of physicians’ perceptions for health communication and disease prevention is imperative because perceptions have consistently been identified as a predictor of subsequent behavior (Pittet et al., 2004; Zimmerman, Rees, Posick, & Zimmerman, 2016). For
instance, physicians engage in greater patient-centered communication with patients whom they perceive to be better communicators or more likely to adhere to recommendations (Street et al., 2007). Moreover, physicians’ perceptions of their patients’ education levels and physical activity preferences can directly impact their treatment recommendations (e.g., offering surgery to patients with coronary artery disease; Van Ryn et al., 2006). Because physicians’ perceptions have important behavioral implications for patients’ outcomes, perceptions may be particularly problematic when they do not reflect patients’ actual beliefs or behaviors.

Limitations and Future Directions

Although the effect sizes, consistent with other research, were small-to-medium in magnitude, small effect sizes can have important practical and clinical significance (Prentice & Miller, 1992). For instance, discordant health beliefs among physicians and patients can directly undermine communication and prevention efforts (Kronish, Leventhal, & Horowitz, 2012). Additionally, although there was a low physician response rate (2.7%), this response rate is somewhat comparable to other response rates that have been identified when surveying health professionals online (Braithwaite, Emery, De Lusignan, & Sutton, 2003; Ernst, Brand, Lhachimi, & Zeeb, 2018).

Additionally, the national sample is not matched or directly connected to the physician sample. However, both the physician and patient samples are nationally distributed, decreasing concerns that the effects are localized. In addition, multiple efforts were made to increase the comparability between the physician and national sample, such as using survey items for the physician sample that matched the survey items used for the national sample, and excluding physicians whose patient population was lower than 90% White, Black, or Latino. However,
because the pattern of means was identical after this exclusion, we retained the full physician sample.

Finally, there was a 5-6 year time lag in data collection between the physician and national sample surveys. To alleviate concerns about making direct comparisons across samples, we collected additional data using an online sample. This more recent data collection generally replicated the findings reported for the national sample and offered additional support for our conclusions.

Future research should aim to replicate the present findings, which focus on physician beliefs, among physician populations who diverge in training (e.g., allopathic physicians) and specialty (e.g., internists). Moreover, because empirical testing of the specific ways in which beliefs about diabetes influence diabetes-related communication is limited, future research should test how physicians’ health beliefs about the perceived causes and controllability of type 2 diabetes translate into communication efforts with patients. In particular, future work should examine how health beliefs regarding the causes and controllability of type 2 diabetes are expressed within clinical settings to investigate the bi-directional exchange of information during clinical encounters (e.g., how communication efforts may shape both physicians and patients’ health beliefs simultaneously).

4.2 Conclusion

Although physicians perceive discordance between their own and their patients’ health beliefs regarding the causes and controllability of type 2 diabetes, their beliefs are in greater concordance than expected. Because extensive research identifies the implications of discordance for health communication and behavior, presuming discordance, particularly when these perceptions are overestimated, may further inhibit efforts to prevent the development of
diabetes. Given the instances of actual and perceived discordance in health beliefs identified in this study, efforts should be made to increase the alignment between physicians and patients’ beliefs to enhance patient education and improve patient care.
Disclosure statement: The authors do not have any disclosures to report.

Data availability: The data that support the findings of this study are available from the corresponding authors (V.D. or A.E.) upon reasonable request.
References


Table 1. Reported demographics for the physician and national sample.

<table>
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<tr>
<th>Race</th>
<th>%</th>
<th>Gender</th>
<th>%</th>
<th>Age</th>
<th>Years</th>
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<tr>
<th>Patient Insurance</th>
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<th>Patient Race</th>
<th>Mean</th>
<th>Patients Cared for with Type 2 Diabetes (per month)</th>
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### NATIONAL SAMPLE DEMOGRAPHICS

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*Note.* Physicians were told that their estimates for patient insurance and patient race should add up to 100%. However, the cumulative percentages do not equal 100% because some participants underestimated and/or overestimated the percentage values. Demographics for the national sample includes sampling weights.
Table 2. Study means: Comparing physicians’ beliefs, physicians’ perceptions of their patients’ beliefs, and the national sample’s beliefs.

<table>
<thead>
<tr>
<th>Survey Items</th>
<th>Item Scale</th>
<th>Physicians’ Beliefs Mean (SE)</th>
<th>Physicians’ Perceptions About Patient Beliefs Mean (SE)</th>
<th>National Sample’s Beliefs Mean (SE)</th>
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</tr>
<tr>
<td>In your opinion, how much is <em>a patients’</em> chance of getting type 2 diabetes due to his/her genes or genetic make-up?</td>
<td>1, Not at all, to 5, Almost all/All</td>
<td>3.40 (.053)</td>
<td>3.65 (.068)</td>
<td>2.68 (.066)</td>
</tr>
<tr>
<td>Question</td>
<td>Option 1</td>
<td>Option 2</td>
<td>Option 3</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>In your opinion, how much is a patient's chance of getting type 2 diabetes due to what he/she eats?</td>
<td>1, Not at all, to 5, Almost all/All</td>
<td>3.98, (.047)</td>
<td>3.24, (.059)</td>
<td>3.27, (.065)</td>
</tr>
<tr>
<td>In your opinion, how much is a patient's chance of getting type 2 diabetes due to how much he/she exercises?</td>
<td>1, Not at all, to 5, Almost all/All</td>
<td>3.62, (.050)</td>
<td>2.87, (.060)</td>
<td>3.37, (.055)</td>
</tr>
<tr>
<td>In your opinion, is type 2 diabetes due more to a patient’s genes or more to their lifestyle and health habits?</td>
<td>1, A lot more to genes, to 5, A lot more to lifestyle and health habits</td>
<td>3.77, (.077)</td>
<td>2.51, (.090)</td>
<td>4.01, (.087)</td>
</tr>
</tbody>
</table>

**Perceived Controllability**

<table>
<thead>
<tr>
<th>Question</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>If type 2 diabetes runs in a patient’s family, there’s not much they can do to avoid getting it.</td>
<td>1, Strongly disagree, to 4, Strongly agree</td>
<td>1.67, (.039)</td>
<td>2.84, (.047)</td>
</tr>
<tr>
<td>A patient with type 2 diabetes will have this illness for the rest of his/her life</td>
<td>1, Strongly disagree, to 4, Strongly agree</td>
<td>2.57, (.059)</td>
<td>3.03, (.041)</td>
</tr>
<tr>
<td>In your opinion, how much can your patients control whether or not they get type 2 diabetes?</td>
<td>1, Not at all, to 5, Almost Completely/Completely</td>
<td>3.92, (.045)</td>
<td>3.04, (.061)</td>
</tr>
</tbody>
</table>

*Note.* Significant differences are denoted by subscripts. The listed survey items measured physicians’ beliefs.
Figure 1. Study results: Physicians and the national sample’s beliefs regarding the perceived causes of type 2 diabetes
Note. “Genes vs. lifestyle” is reported on a scale ranging from 1, a lot more to genes, to 5, a lot more to lifestyle and health habits. “Due to genes”, “due to diet”, and “due to exercise” are reported on a scale ranging from 1, not at all, to 5, almost all/all. Error bars represent ± 2 SE.
Note. “Unavoidable if runs in family” and “Have illness forever” are reported on a scale ranging from 1, strongly disagree, to 4, strongly agree. “Can control diabetes” is reported on a scale ranging from 1, not at all, to 5, almost completely/completely. Error bars represent ± 2 SE.