PCBH Framework: Comparison of Models of Integration Paper Using Diabetes

Joanna Reckley

Department of Counseling, University of Texas Rio Grande Valley

COUN 6386: Foundations of Integrated Behavioral Health Care

Dr. Bianca Villalobos

November 16, 2022

Introduction

Primary care behavioral health (PCBH) is a relatively newer model being proposed and implemented in order to include behavioral health services into primary care settings. This specific model is built to strengthen the overall field of primary care rather than just promoting mental health. The idea is that by integrating the specialist into primary care, many factors that lead to poorer outcomes can be dealt with without increasing the workload of those who work in primary care. In a way, the behavioral health consultant works as a care provider, educator, advocate, and teammate. These are all critical ideas within the model that boost the efficiency and outcomes of these integrated roles. Further because, "effective integration of mental health care into primary care requires systematic and pragmatic change that builds on the strengths of both mental health and primary care" (Thielke et al., 2007) it is necessary to use the framework in a way that fully merges the two fields. Generally speaking, the population that PCBH programs look at is whatever is encompassed by the practice the BCH is being introduced to, usually either family medicine or pediatric practices.

One piece of information that is well known is that PCPs in general allow for overall better health outcomes (Gunta et al., 2022). The problem with this idea is the fact that population growth vs number of PCPs has not been equivalent[1] and so there are many predictions of shortages of PCPs (Zhang, Lin, Pforsich, and Lin, 2020). Thus, the number of PCPs needed is not being reached in a general look at the United States (Petterson et al., 2012). This overworking of PCPs can lead to burnout (Patel et al., 2018) and lower quality of care to patients across the board and leading to larger problems in the healthcare field as a whole. Classically, the solution to this problem was the incorporation of professions such as nurse practitioners (NPs)

[1] For more information, discussion of findings in appendix A.

that could remove some of the burden from the PCPs, and the results have largely been a success with both PCPs and NPs reporting increased satisfaction and perceived quality of care within practices (Poghosyan, Ghaffari, Liu, & Friedberg, 2020).

This background is important because it shows that this solution does in fact work and provides a route for PCBH programs to be implemented. Outpatient care is generally viewed as an important part of care but in the mental health field many of these issues are overlooked in an outpatient setting. By incorporating mental health specialists such as from the PCBH model perception of care by patients is increased by significant margins (Leung et al., 2021). This important information because not only does a better perception of care lead to better health outcomes, but it also leads to increased rapport and trust between patient and physician. Further and most important by implementing mental health specialists we can remove stigma that allows for that holistic care of the patients (Knack, Mantler, and Szeto, 2017).

As far as it goes for specificities and technicalities, while mental health as a whole needs to be included in holistic care, the PCBH model is designed to be used in primary care to be an adjunct to PCPs and has less utility outside of this sphere. Much like NPs, behavioral health consultants fill a niche of removing some of the burden that PCPs are faced with by working on the aspects of behavioral and mental health that either the PCP overlooks, does not know about, or has no time to practice.

Despite all these benefits and the support in theory, there are still issues that are faced when attempting to incorporate these integrated models. One, issue that is faced is the disconnect between appreciation of the field and actual usage (Westheimer, Steinley, and Brownson, 2008). Another issue that is important to address is the additional training that is needed to allow BHCs to work in primary care settings, but the issue with this is that it requires a long-term solution

that builds a better foundation rather than creating BHCs at the present moment. The idea is that by teaching the different fields that can participate while they are still in school can allow for this integration (Dennelly, 2019), but as noted, this is an extremely long-term solution so it will take time before true implementation. A final point of discussion for challenges that face these integrated models is a potential view of providing substandard care as PCPs may feel they are losing autonomy or differing views of what is actually sufficient care and what is not (Pomerantz, Corson, and Detzer, 2009). This is more so a barrier to true integration than the services in and of themselves, further it seems that at certain levels this issue may be more prevalent, which will be seen later on with the description of levels of integration. These are all critical issues that must be dealt with in order to allow practical improvement of the models and true integration, especially when using a framework such as the triple aim of health outcomes[2].

In the healthcare field, there is an idea which revolves around a framework that separates different levels of collaboration and integration. At first, the categorization of the levels came from a research paper where they proposed just five levels to use as tools of categorization[3]. These levels encompassed the extent to which integration and collaboration was occurring but did not account for the specifics of each individual interaction. This lack of encompassing specific situations meant that the framework was meant to be used essentially as a handbook would be used to build the foundation rather than rules. The five levels included minimal collaboration, basic collaboration at a distance, basic collaboration onsite, close collaboration in a partly integrated system, and close collaboration in a fully integrated system. The actual details of each category will be discussed more fully with an example later in this paper. Up until

[2] Further discussion about challenges and barriers to implementation discussed in appendix B. Espcialy in the context of triple aim model.

[3] Doherty et al. Five Levels of Primary Care/ Behavioral Healthcare Collaboration (Behavioral Healthcare Tomorrow, 1996), 25-27.

recently, this was the framework that was used, but U.S. Department of Health and Human Services proposed a new framework to measure and identify integration and collaboration[4]. This new system took the first and reformed the last two levels into three modified levels with clearer boundaries. The new categories that take levels four, five, and six, follow respectively as close collaboration with some system integration, close collaboration approaching an integrated practice, and finally, full collaboration in a transformed/merged practice. Ultimately these breakdowns are ways that healthcare models can be broken down and understood in terms of the depth of interaction between two distinct groups.

Chosen Disease and Population

Diabetes is a disease that many people know about misunderstand or have incomplete information on. Diabetes has a few different categories that determine different outcomes, treatment plans, and mechanisms of pathology. In order to fully understand how this disease can be dealt with across different levels, I believe a brief description of the disease is extremely helpful. To begin with diabetes can be split into two starting categories that are diabetes insipidus and diabetes mellitus[5]. Diabetes mellitus can be further characterized by types 1 and type 2 which are prevalent in different ethnicities and locations, usually. This essay will focus on diabetes mellitus and specifically type 2 and the effects of the pathology across the different levels, treatment plans/goals, and health outcomes. The reason for the distinction is that the focus that this essay was intended to take was the population in the Rio Grande Valley. Here in the Rio Grande Valley, the population is largely made up of Hispanic background[6] (appendix D)[7]. Within the Hispanic population, not just in this region but across the United States, both the

[4] Heath B, A Review and Proposed Standard Framework for Levels of Integrated Healthcare (2013).
[5] For a better description of the classification of diabetes see appendix C
[6] To see a better description of the population breakdown and explanation see appendix D
[7] Connect RGV, Demographics of the Rio Grande Valley (2022).

prevalence and incidence of type 2 diabetes mellitus is higher than the general population. These reasons include many different facets of life, but some extremely important statistics have to do with health literacy, cultural factors, education levels, and biological factors[8] (Aguayo-Massucato et al., 2019). Both the breakdown and population and the increased prevalence and incidence of this specific diabetes in this population are the reasons for the focus throughout this paper. The exact pathological process[9] is also important in understanding outcomes and treatment goals due to the idea that diabetes and treatment conflict in many ways with cultural norms and lifestyle.

Case Presentation

For this paper we will walk through the different levels of integration with our imaginary patient, Mr. H, who is a 41-year-old Hispanic man, who does not have a high level of health literacy. Furthermore, he has been diagnosed as having diabetes, he does not quite understand what this diagnosis entails, or the treatment associated. In not understanding, he looks more toward alternative treatments such as herbs from a yerbería and has been labeled "non-compliant" by PCPs. Finally, this patient, being an immigrant from Mexico struggles to pay for health services due to both being the provider for the family and not having insurance.

Levels of Integrated Care

Coordinated Care

Coordinated care is the first step in explaining levels of integration and how they apply to the PCBH model. At the root of the model is the minimal collaboration which as discussed early is as basic as different specialties and professions agreeing to work together. At a minimal level this just simply occurs disjointed with little to no communication about the care or management

[8] Socioeconomic differences in Hispanics and Non-Hispanic Whites can be seen in appendix E.
[9] While the exact pathophysiology is not expressed here, in appendix F, the pathophysiology is explained further.

plans. With the next step up, there is at the very least a communication between these professions this cooperativity is designed to better serve the patient without being too invasive of the current practices of specialties. This can be seen in practices that are disjoint in a way that disallows effective cooperation such as a PCP and a counselor both being seen but only being superficially knowing that the service is being used. Generally speaking, this is a common model for specialties that span the medical field. If you need to see multiple different professionals, each may want to know if another is being seen and general documentation but the communication ends there.

At this level the different physicians that Mr. H sees are not in contact with each other unless they need information. Mr. H also does not help the communication process due to loss of ability to understand certain parts of his diagnosis and treatment goals. For Mr. H this care looks disorganized despite using multiple different providers and he sometimes does not know who to believe if information sounds contradictory. Further the nuances of each provider and professional increase the complexity further inhibiting from even desiring to seek out help in treatment plans that are not well understood. In our scenario, Mr. H is receiving care by a PCP exclusively for treatment of his diabetes without mental health being taken into account. Mr. H is receiving care by therapists about struggles in dealing with diabetes and other stressors in his life but other than current medications, the therapists do not fully take into account the depth of the diagnosis and the progression on a medical level and how this can interplay with mental health outcomes. Each provider knows that the other service is being used but leaves the outcome of the disjoint field completely to the other professional.

This leads to the need to focus on communication in order to build better bonds with patients and other providers/BHCs/professionals. Without increased communication, higher

levels of integration cannot be achieved. This scenario leads directly into the ethical dilemma present at this level, which is providing care in a way that one professional contradicts the other which can lead to lack of understanding, poor outcomes, and poor compliance.

Co-Located Care

This level of care is the next on the tier list of integration. As the name suggests, co-located care is the practice of having multiple different types of professionals at the same physical location. This can occur either at the same clinic or within close proximity of the other's practice. There is not a necessity to be in the same building but as can be expected, the closer, the more intimate the professionals. These levels of integration build on the previous levels of coordinated care by using shared locations and dealing with physical proximity to each other. At these levels of care, such as between PCP and BHC, can be intermixed with them working together to achieve better outcomes. To be explicitly detailed, level 3 is the pure onsite proximity or close physical proximity to one another, while level 4 builds on level 3 and adds a bit of system integration. At this level, despite there being better communication and physical proximity, the lack of union between systems can create points of disjointed and non-continuous care.

In using the close proximity better health outcomes can be achieved simply by the accessibility to the other specialty (Richman, Lombardi, & Zerden, 2020). Co-located mental health and classical health professions has shown results in pediatric populations that suggest a need to make this type of care more accessible (Levy et al., 2017) as well as showing reduced depressive symptoms across a population (Blackmore et al., 2018). Another important point to note is that not only are there better health outcomes, but patients also see these integrations as favorable (Berkowitz et al., 2018). Even with these benefits being shown in the data collected

across the different studies, there are still real drawbacks that need to be addressed. Co-located care can actually be inhibited by workforce shortages which decreases the amount of integration that can occur (Miller, Burke, et al., 2014). Miller in another study explains how there are undeniable benefits to this kind of care, but issues arise if practice size does not permit further integration, and also that physicians are more likely to be co-located in 'frontier areas' rather than urban areas (Miller, Levey, et al., 2014). Finally, there are unique ways of navigating these types of care that deviate the textbook cases and each practice will show different methods and usage of the resources on hand (Hoff et al., 2020).

At the co-located levels of integration, our patient, Mr. H, sees both his PCP and his therapist who work together to manage his care but due to the different professions, the systems cause a lack of union despite the PCP and therapist communicating and working at the same office building. One of the goals here is to remove barriers to patients seeing different professions via removing the barrier of travel altogether. At this level the care that Mr. H is receiving from his PCP is directly related to the care that is received by the BCH since they are able to communicate plans, they have for him. One problem that arises here is that in order to actually understand and see the treatment plans communication is needed since the system being used operates differently between them. This allows Mr. H to ask better questions and get better answers due to the availability of help. This also means that ultimately there will be multiple different treatment plans and goals that Mr. H will have to keep track of which leads to a higher probability of being non-compliant.

Without proper care at this level an ethical dilemma revolving around privacy and HIPAA issues can occur. Due to the fact that separate systems are being used, care needs to be taken to assure that confidentiality is maintained for the patient. There needs to be a way for the

two systems to communicate such that nothing is released in a way that violates this trust and confidentiality that the patient has.

Integrated Care

The final section of levels of integrated care consists of the category of integrated care. The explicit levels that make up this category are level 5 – close collaboration approaching integrated care, and level 6 – full collaboration in a transformed practice. At this categorization level there is a complete modification of both PCP practices and mental health practices. The two work together and adapt in order to modify treatment goals and outcomes for individuals. Further the system that is used to see and treat patients is blended from both PCPs and BHCs for example, to allow both to optimize their ability to perform the functions that the patients need. This is a critical distinguishing factor that builds on the previous category, by having an integrated system better care is available since there is complete transparency by all professionals the entire way through the treatment plan. Further, the entire team works as a unit to develop a single treatment plan holistically rather than add-ons or multiple disconnected treatment plans.

At the fully integrated level of integration, it boils down to the simple idea that the different professionals are in fact a team that work together to create treatment plans. There is a discontinuation of compartmentalization leading to more holistic care that takes into account the circumstance of the patient rather than the application of a generic treatment. Data clearly shows that integrated personalized diabetes management (iPDM) improved the use of diagnostic data and this better usage led to higher levels of glycemic control, speed in which necessary adjustments were made, and adherence to treatment (Kulzer et al., 2018 and Jones et al., 2021).

Mr. H in a fully integrated care system, is receiving both mental health services as well as classical medical services to manage symptoms, disease progression, lifestyle, and behaviors. The way this plays out in a practical way is the single management and treatment plan that was created by a team of different health professionals looking at Mr. H's case holistically rather than compartmentalizing different aspects of his life. This holistic view will most probably lead to better management of his disease as well as an increase amount of trust and positive perception by the patient and his family (Berkowitz et al., 2018 and Klemenc-Ketis et al., 2021).

With all of the data pointing toward positive results, the fact that the proposed mechanism is so new means that there is not as much funding as necessary to sustain these practices sometimes. While the data provides support that the fully integrated care leads to better outcomes in diabetes management and so by promoting more research data points to be collected, better funding can occur (Busetto et al., 2016). This points us toward advocating for our BHC and PCBH roles as well as educating the public, physicians, and policy makers as to how these integrated roles can truly help the community. Even among the weak points in the integrated model proposal and application, the strength of the model completely overshadows these drawbacks leading to the push that Busetto discusses in educating policy makers to get more funding (Klemenc-Ketis et al., 2021).

PCBH Model

With all the discussion of levels of integration and care, using a patient example. The PCBH model can be better understood and explained on a foundational level. The theory behind the model is shooting for the integrated care subgroup containing levels 5 and 6. As discussed, these levels allow for more holistic care for patients across the board, using a model that looks at the patient as a whole person rather than using the disease model. In having this level of

integration better health outcomes are not only expected but actually seen. Despite there being initial barriers and challenges, with relatively simple solutions arrival at these levels is possible. In order to navigate the blending of two practices certain logistics need to be worked out such as the layout of the practice, the role boundaries for PCPs and BHCs, communication systems such as EHRs, and a few others that can cause tension and bad-blood if not dealt with early on.

Luckily, most of the logistics have been worked out by previous BHCs, PsyDs, and PhDs. While not a complete solution to these issues, the book Behavioral consultation and primary care book by Robinson and Reiter provides a general handbook for these common problems. The solutions and advice in the handbook can be adapted to the unique circumstance of the new BHC allowing for smoother integration of services.

To conclude this paper, it seems clear that while more data and treatment outcomes are needed to effectively prove the point being made, there is more than sufficient data to create an overwhelming argument for the good of the model. This data needs to be used in order to advocate, not just for the sake of the PCBH model, but for the sake of the patients of the community that we intend to practice in. We need to push the education onto the population, onto physicians and other medical healthcare workers, and onto policy makers. This will effectively allow us to make a positive change on the healthcare field and change patient lives for the better.

References

Aguayo-Mazzucato, C., Diaque, P., Hernandez, S., Rosas, S., Kostic, A., & Caballero, A. E. (2019). Understanding the growing epidemic of type 2 diabetes in the Hispanic population living in the United States. *Diabetes/metabolism research and reviews*, *35*(2), e3097. https://doi.org/10.1002/dmrr.3097

Ahlqvist, E., Storm, P., Käräjämäki, A., Martinell, M., Dorkhan, M., Carlsson, A., Vikman, P., Prasad, R. B., Aly, D. M., Almgren, P., Wessman, Y., Shaat, N., Spégel, P., Mulder, H., Lindholm, E., Melander, O., Hansson, O., Malmqvist, U., Lernmark, Å., … Groop, L. (2018). Novel subgroups of adult-onset diabetes and their association with outcomes: A data-driven cluster analysis of six variables. *The Lancet Diabetes & Endocrinology*, *6*(5), 361–369. https://doi.org/10.1016/s2213-8587(18)30051-2

Benuto, L. T., & O'Donohue, W. (Eds.). (2016). Enhancing Behavioral Health in Latino Populations. https://doi.org/10.1007/978-3-319-42533-7

Berkowitz, S. A., Eisenstat, S. A., Barnard, L. S., & Wexler, D. J. (2018). Multidisciplinary coordinated care for Type 2 diabetes: A qualitative analysis of patient perspectives. *Primary care diabetes*, *12*(3), 218–223. https://doi.org/10.1016/j.pcd.2018.01.005

Blackmore, M. A., Carleton, K. E., Ricketts, S. M., Patel, U. B., Stein, D., Mallow, A., Deluca, J. P., & Chung, H. (2018). Comparison of Collaborative Care and Colocation Treatment for Patients With Clinically Significant Depression Symptoms in Primary Care. *Psychiatric services (Washington, D.C.)*, *69*(11), 1184–1187. https://doi.org/10.1176/appi.ps.201700569

Bridges, A. J., Villalobos, B. T., Anastasia, E. A., Dueweke, A. R., Gregus, S. J., & Cavell, T. A. (2017). Need, access, and the reach of integrated care: A typology of patients. *Families, systems & health : the journal of collaborative family healthcare*, *35*(2), 193–206. https://doi.org/10.1037/fsh0000268

Brunton S. (2016). Pathophysiology of Type 2 Diabetes: The Evolution of Our Understanding. The Journal of family practice, 65(4 Suppl), supp_az_0416.

Busetto, L., Luijkx, K. G., Elissen, A. M., & Vrijhoef, H. J. (2016). Intervention types and outcomes of integrated care for diabetes mellitus type 2: a systematic review. *Journal of evaluation in clinical practice*, *22*(3), 299–310. https://doi.org/10.1111/jep.12478

Chen, T. C., Clark, J., Riddles, M. K., Mohadjer, L. K., & Fakhouri, T. H. I. (2020). National Health and Nutrition Examination Survey, 2015-2018: Sample Design and Estimation Procedures. *Vital and health statistics. Series 2, Data evaluation and methods research*, (184), 1–35.

Chen, T. C., Parker, J. D., Clark, J., Shin, H. C., Rammon, J. R., & Burt, V. L. (2018). National Health and Nutrition Examination Survey: Estimation Procedures, 2011-2014. *Vital and health statistics. Series 2, Data evaluation and methods research*, (177), 1–26.

Connect, R. G. V. H. (n.d.). *RGV Health Connect*. RGV Health Connect :: Demographics :: Region :: Rio Grande Valley :: Population. Retrieved November 16, 2022, from https://www.rgvhealthconnect.org/demographicdata?id=281259§ionId=935#sectionPiece_85

Dennelly, Lauren. (2019). Navigating Psychosocial Challenges in Primary Care with an Integrated Behavioral Health Model. Clinical Social Work Journal. 47. 10.1007/s10615-019-00708-0.

Doerr, T. D., Olson, H. B., & Zimmerman, D. C. (2014, December 12). *The Accountable Primary Care Model: Beyond Medical Home 2.0*. AJMC. Retrieved from https://www.ajmc.com/view/the-accountable-primary-care-model-beyond-medical-home-20

Doherty, W. J., McDaniel, S. H., & Baird, M. A. (1996). Five levels of primary care/behavioral healthcare collaboration. *Behavioral healthcare tomorrow*, *5*(5), 25–27.

Fletcher, B., Gulanick, M., & Lamendola, C. (2002). Risk factors for type 2 diabetes mellitus. The Journal of cardiovascular nursing, 16(2), 17–23. https://doi.org/10.1097/00005082-200201000-00003

Gunta, S. P., Ul-Ejaz, A., Murphy, A. M., Gunn, K. M., Bhatnagar, A., Angraal, V., Lopez-Candales, A., & Angraal, S. (2022). Association of number of primary care physicians with preventable hospitalizations and premature deaths. *Postgraduate medicine*, *134*(2), 205–209. https://doi.org/10.1080/00325481.2021.2021038

Heath B, Wise Romero P, and Reynolds K. A Review and Proposed Standard Framework for Levels of Integrated Healthcare. Washington, D.C. SAMHSA-HRSA Center for Integrated Health Solutions. March 2013.

Hoff, A., Hughes-Reid, C., Sood, E., & Lines, M. (2020). Utilization of Integrated and Colocated Behavioral Health Models in Pediatric Primary Care. *Clinical pediatrics*, *59*(14), 1225–1232. https://doi.org/10.1177/0009922820942157

IHS Markit Ltd. The Complexities of Physician Supply and Demand: Projections From 2019 to 2034. Washington, DC: AAMC; 2021.

Jones, A., Bardram, J. E., Bækgaard, P., Cramer-Petersen, C. L., Skinner, T., Vrangbæk, K., Starr, L., Nørgaard, K., Lind, N., Bechmann Christensen, M., Glümer, C., Wang-Sattler,

R., Laxy, M., Brander, E., Heinemann, L., Heise, T., Schliess, F., Ladewig, K., & Kownatka, D. (2021). Integrated personalized diabetes management goes Europe: A multi-disciplinary approach to innovating type 2 diabetes care in Europe. Primary care diabetes, 15(2), 360–364. https://doi.org/10.1016/j.pcd.2020.10.008

Kazdin, A. E., & Blase, S. L. (2011). Rebooting Psychotherapy Research and Practice to Reduce the Burden of Mental Illness. *Perspectives on psychological science : a journal of the Association for Psychological Science*, *6*(1), 21–37. https://doi.org/10.1177/1745691610393527

Klemenc-Ketis, Z., Stojnić, N., Zavrnik, Č., Ružić Gorenjec, N., Danhieux, K., Lukančič, M. M., & Susič, A. P. (2021). Implementation of Integrated Primary Care for Patients with Diabetes and Hypertension: A Case from Slovenia. International journal of integrated care, 21(3), 15. https://doi.org/10.5334/ijic.5637

Knaak, S., Mantler, E., & Szeto, A. (2017). Mental illness-related stigma in healthcare: Barriers to access and care and evidence-based solutions. Healthcare management forum, 30(2), 111–116. https://doi.org/10.1177/0840470416679413

Kolb, H., & Martin, S. (2017). Environmental/lifestyle factors in the pathogenesis and prevention of type 2 diabetes. BMC medicine, 15(1), 131. https://doi.org/10.1186/s12916-017-0901-x

Kulzer, B., Daenschel, W., Daenschel, I., Schramm, W., Messinger, D., Weissmann, J., Vesper, I., Parkin, C. G., & Heinemann, L. (2018). Integrated personalized diabetes management improves glycemic control in patients with insulin-treated type 2 diabetes: Results of the PDM-ProValue study program. Diabetes research and clinical practice, 144, 200–212. https://doi.org/10.1016/j.diabres.2018.09.002

Leung, L. B., Rose, D., Guo, R., Brayton, C. E., Rubenstein, L. V., & Stockdale, S. (2021). Mental health care integration and primary care patient experience in the Veterans Health Administration. Healthcare (Amsterdam, Netherlands), 9(4), 100587. https://doi.org/10.1016/j.hjdsi.2021.100587

Levy, S. L., Hill, E., Mattern, K., McKay, K., Sheldrick, R. C., & Perrin, E. C. (2017). Colocated Mental Health/Developmental Care. *Clinical pediatrics*, *56*(11), 1023–1031. https://doi.org/10.1177/0009922817701172

Miller BF, Petterson S, Brown Levey SM, Payne-Murphy JC, Moore M, Bazemore A. Primary care, behavioral health, provider colocation, and rurality. J Am Board Fam Med. 2014 May-Jun;27(3):367-74. doi: 10.3122/jabfm.2014.03.130260. PMID: 24808115.

Miller, B. F., Petterson, S., Burke, B. T., Phillips, R. L., Jr, & Green, L. A. (2014). Proximity of providers: Colocating behavioral health and primary care and the prospects for an integrated workforce. The American psychologist, 69(4), 443–451. https://doi.org/10.1037/a0036093

Parsons, V. L., Moriarity, C., Jonas, K., Moore, T. F., Davis, K. E., & Tompkins, L. (2014). Design and estimation for the national health interview survey, 2006-2015. *Vital and health statistics. Series 2, Data evaluation and methods research*, (165), 1–53.

Patel RS, Bachu R, Adikey A, Malik M, Shah M. Factors Related to Physician Burnout and Its Consequences: A Review. Behav Sci (Basel). 2018 Oct 25;8(11):98. doi: 10.3390/bs8110098. PMID: 30366419; PMCID: PMC6262585.

Petterson SM, Liaw WR, Phillips RL Jr, Rabin DL, Meyers DS, Bazemore AW. Projecting US primary care physician workforce needs: 2010-2025. Ann Fam Med. 2012 Nov-Dec;10(6):503-9. doi: 10.1370/afm.1431. PMID: 23149526; PMCID: PMC3495923.

Poghosyan, L., Ghaffari, A., Liu, J., & Friedberg, M. W. (2020). Physician-Nurse Practitioner Teamwork in Primary Care Practices in New York: A Cross-Sectional Survey. Journal of general internal medicine, 35(4), 1021–1028. https://doi.org/10.1007/s11606-019-05509-2

Pomerantz, A. S., Corson, J. A., & Detzer, M. J. (2009). The challenge of integrated care for mental health: leaving the 50-minute hour and other sacred things. *Journal of clinical psychology in medical settings 16*(1) 40–46. https://doi.org/10.1007/s10880-009-9147-x

Reiter, J.T., Dobmeyer, A.C. & Hunter, C.L. The Primary Care Behavioral Health (PCBH) Model: An Overview and Operational Definition. J Clin Psychol Med Settings 25, 109–126 (2018). https://doi.org/10.1007/s10880-017-9531-x

Richman, E. L., Lombardi, B. M., & Zerden, L. D. (2020). Mapping colocation: Using national provider identified data to assess primary care and behavioral health colocation. *Families, systems & health : the journal of collaborative family healthcare*, *38*(1), 16–23. https://doi.org/10.1037/fsh0000465

Runyan, C. N., Carter-Henry, S., & Ogbeide, S. (2018). Ethical Challenges Unique to the Primary Care Behavioral Health (PCBH) Model. *Journal of clinical psychology in medical settings*, *25*(2), 224–236. https://doi.org/10.1007/s10880-017-9502-2

Stumvoll, M., Goldstein, B. J., & van Haeften, T. W. (2005). Type 2 diabetes: principles of pathogenesis and therapy. Lancet (London, England), 365(9467), 1333–1346. https://doi.org/10.1016/S0140-6736(05)61032-X

Thielke, S., Vannoy, S., & Unützer, J. (2007). Integrating mental health and primary care. *Primary care*, *34*(3), 571–vii. https://doi.org/10.1016/j.pop.2007.05.007

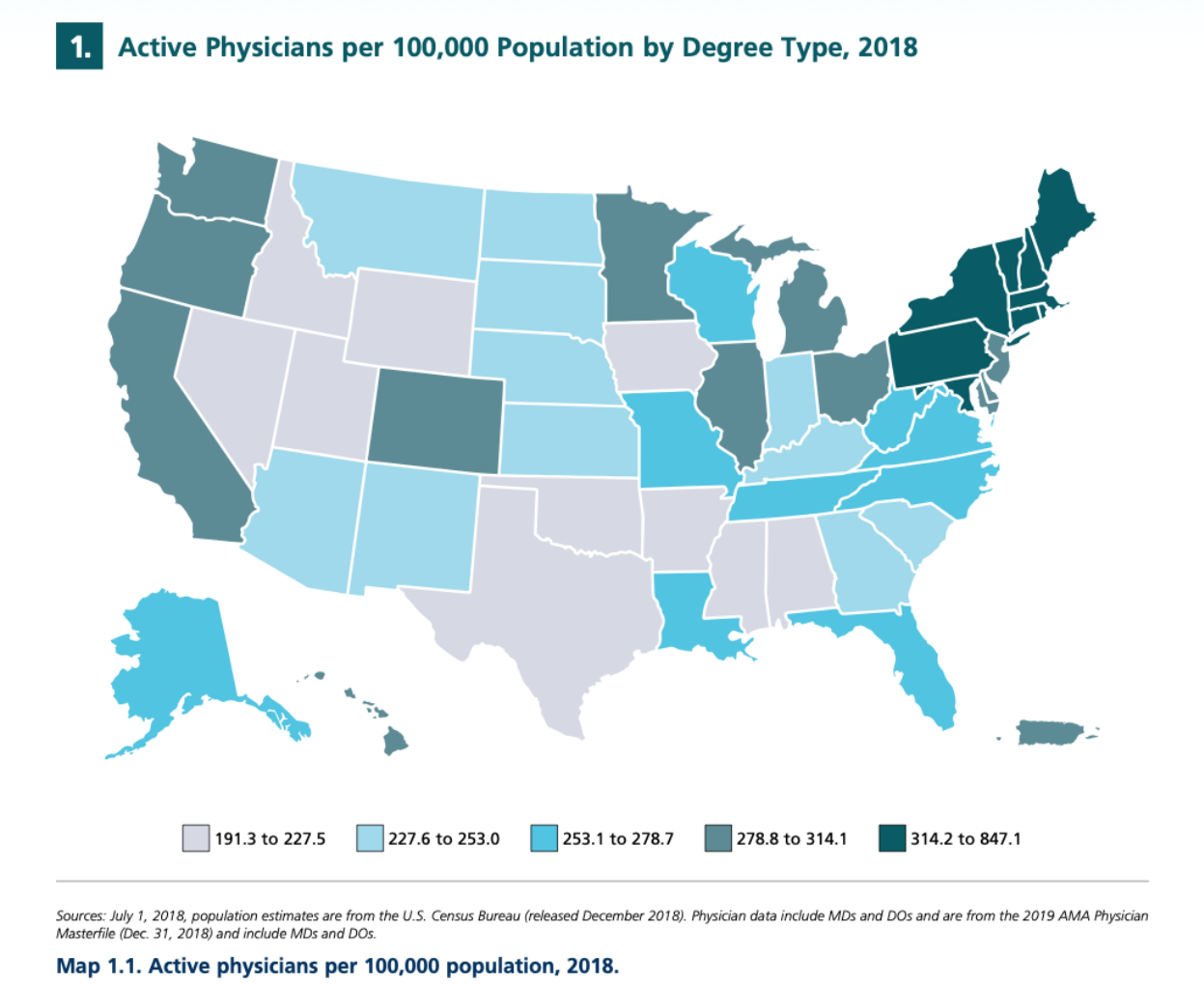
Westheimer, J. M., Steinley-Bumgarner, M., & Brownson, C. (2008). Primary care providers' perceptions of and experiences with an integrated healthcare model. *Journal of American college health : J of ACH*, *57*(1), 101–108. https://doi.org/10.3200/JACH.57.1.101-108

Zhang, X., Lin, D., Pforsich, H., & Lin, V. W. (2020). Physician workforce in the United States of America: forecasting nationwide shortages. *Human resources for health*, *18*(1), 8. https://doi.org/10.1186/s12960-020-0448-3

Appendices

Appendix A

Discussion on General Population vs Number of Primary Care Physicians



As can be seen in this chart provided by AAMC and the U.S. Census Bureau, in many states such as Texas, there is a small number of physician to patient ratio. Which would mean that if the physicians were in fact spread across the state evenly and all were general practitioners, each physician would be responsible for between 440 and 530 patients. This is an absurd number so just looking at this data point is concerning, especially as we live in a location that has an unconcentrated ratio of population to physicians. The disparity is only expected to get worse as

the population grows and the incoming physician population only grows marginally (IHS, 2021). Part of this issue revolves around the idea of a bottle neck at different points in order to actually finish medical school. The first bottleneck is the difficulty to even enter into medical school, the second bottleneck is the difficulty in matching into a residency program, and the third bottleneck is the job search that can offer decent lifestyle separate from work. These three issues are huge problems and one work around is hiring more nurses and physician assistants to extend the number of patients that a single physician can manage. This is the idea of clinical mental health entering into clinics as well. "Comparing projected supply and demand for Primary Care physicians (Exhibit 3) predicts a shortage by 2034 of between 17,800 and 48,000 physicians (Exhibit 4). This range for 2034 is lower than the 2020 report shortage projection of between 21,400 and 55,200 Primary Care physicians by 2033."

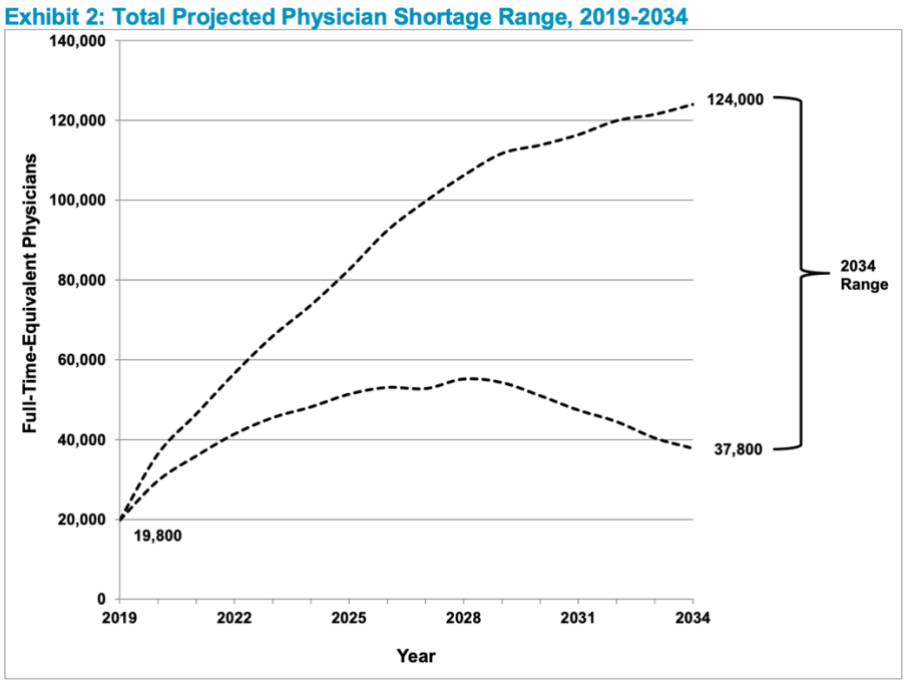


Figure 2. Graph showing projected shortage of general practitioners by 2034.

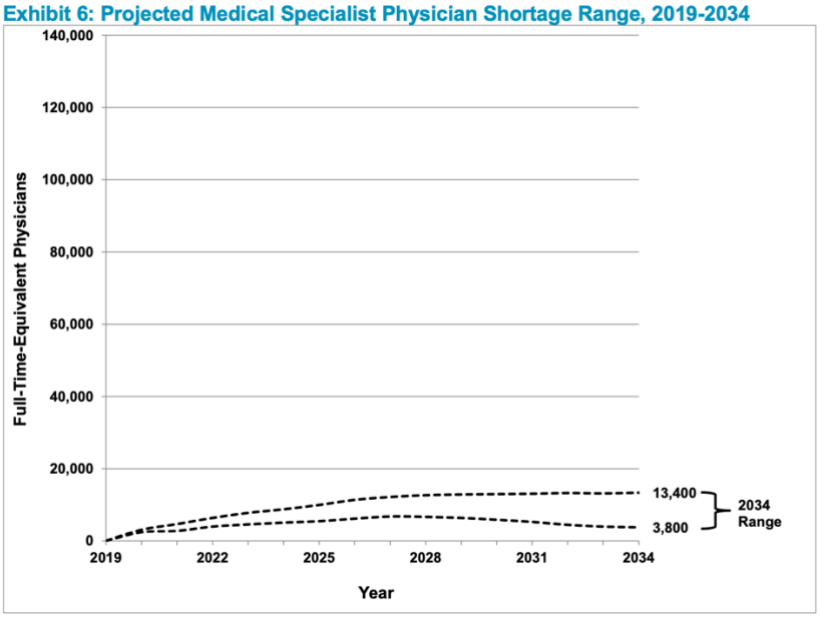


Figure 3. Graph showing shortage of specialist physicians by 2034.

As we can see this becomes a huge issue especially in low-income areas such as the Rio Grande Valley where we already are at a disadvantage in terms of aiding those where physicians are needing more help not less. One distinction that has aided in relieving this discrepancy is the "hospitalists over the past decade has grown rapidly, reflecting a shift in how care is provided rather than in a growing demand for hospital inpatient services."

Essentially the idea that I understand that has been presented is in promoting professions that can aid physicians rather than necessarily promoting an increase in physicians themselves. This is interesting to me because it points at an attempt not to fix the problem but cover up the issue by having more professions to aid the physicians. Luckily, I believe this promotion of other professions provides more effective healthcare that works on a holistic level for the patients.

Appendix B

Challenges to Integrated Mental Healthcare and Barriers to Incorporation

BARRIERS to Using BHC (BUB) QUESTIONNAIRE			
PART A: In your practice, when you consider using any BHC service (a class, warm-handoff, consult, etc.), how often do these factors deter you?	*Almost Never (0)*	*Occasionally (1)*	*Frequently (2)*
1. Patient is already seeing a therapist.			
2. I run out of time.			
3. Other needs/tasks distract me.			
4. Patient refuses the referral.			
5. Patient has seen BHC before for same problem, doesn't want to see again.			
6. Worry about alienating patient by recommending a behavioral health consult.			
7. Not sure how to refer to BHC.			
8. Not sure how to have patient schedule an appointment.			
9. BHC is unavailable or seems busy.			
10. BHC doesn't speak patient's primary language.			
11. Patient is responding well to medications alone; no need for BHC.			
12. Don't want to overwhelm the BHC.			
13. Not sure what to say about cost of BHC visit.			
14. Not sure which patients to send to BHC.			
15. Patient needs specialty psych care.			
16. Unlikely BHC could help with this type of problem.			
If you answered "occasionally" or "frequently to 16, what was/were the problem(s)?			
Other barrier(s)? Please explain:			
PART B: Overall, how helpful is the BHC service **for your patients**? *Please circle a number below.* *No benefit* 0 1 2 3 4 5 6 7 8 9 10 *Extremely beneficial (good patient feedback)*			
PART C: Overall, how helpful is the BHC service **to you (i.e., helps you better serve patients, etc.)?** *Please circle a number below.* *Not helpful* 0 1 2 3 4 5 6 7 8 9 10 *Extremely helpful*			
PART D: If a 6 or below is indicated for PART B and/or PART C, what changes could be made to improve the helpfulness of the BHC service for both you and your patients? Use the backside of this paper to answer if needed.			

Figure 1. Demonstrating a questionnaire acknowledging common barriers the BHC usage.

Essentially the idea behind this questionnaire is to figure out the root of an issue in terms of why the BHCs in clinic are not being used. Further this can generally be used over time to allow physicians to note where they need to better hone their skills as well. At the core, most of the issues are resolved using some form of education about better ways to bring up the services to patients or better explaining the role of BHCs to PCPs. Chapter 16 of the Robinson and Reiter book break down every question that could be asked based on the questionnaire. They give detailed answers that can allow us to prepare for issues that may arise and better promote the BHC services.

Appendix C

Classification of Diabetes by Categories

Image and caption provided by Ahlqvist et al. 2018.

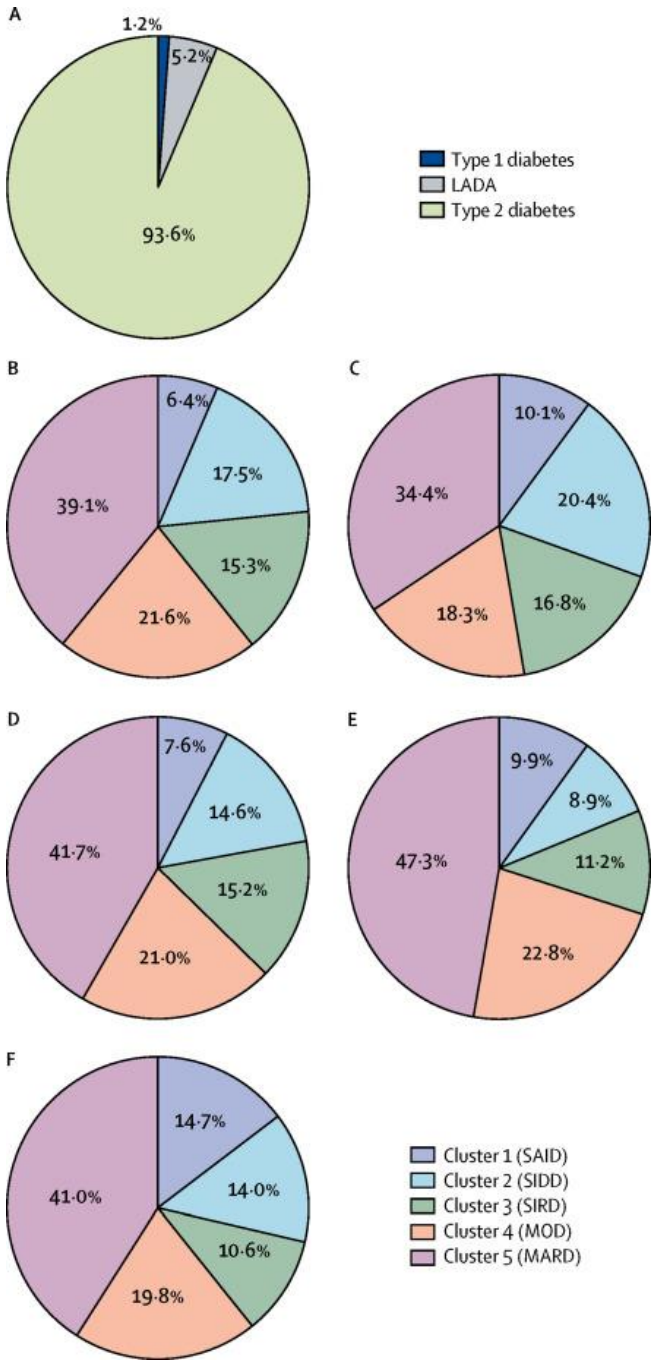


Figure 1

Patient distribution according to method of classification

(A) Distribution of patients (n=8980) according to traditional classification.

(B) Distribution of patients (n=8980) according to k-means clustering.

(C) Distribution of patients in the Scania Diabetes Registry (n=1466) according to k-means clustering.

(D) Distribution of patients in the All New Diabetics in Uppsala cohort (n=844) according to k-means clustering.

(E) Distribution of DIREVA patients with newly diagnosed diabetes (n=878) according to k-means clustering.

(F) Distribution of DIREVA patients with longer-term diabetes (n=2607) according to k-means clustering.

LADA=latent autoimmune diabetes in adults.

SAID=severe autoimmune diabetes.

SIDD=severe insulin-deficient diabetes.

SIRD=severe insulin-resistant diabetes.

MOD=mild obesity-related diabetes.

MARD=mild age-related diabetes.

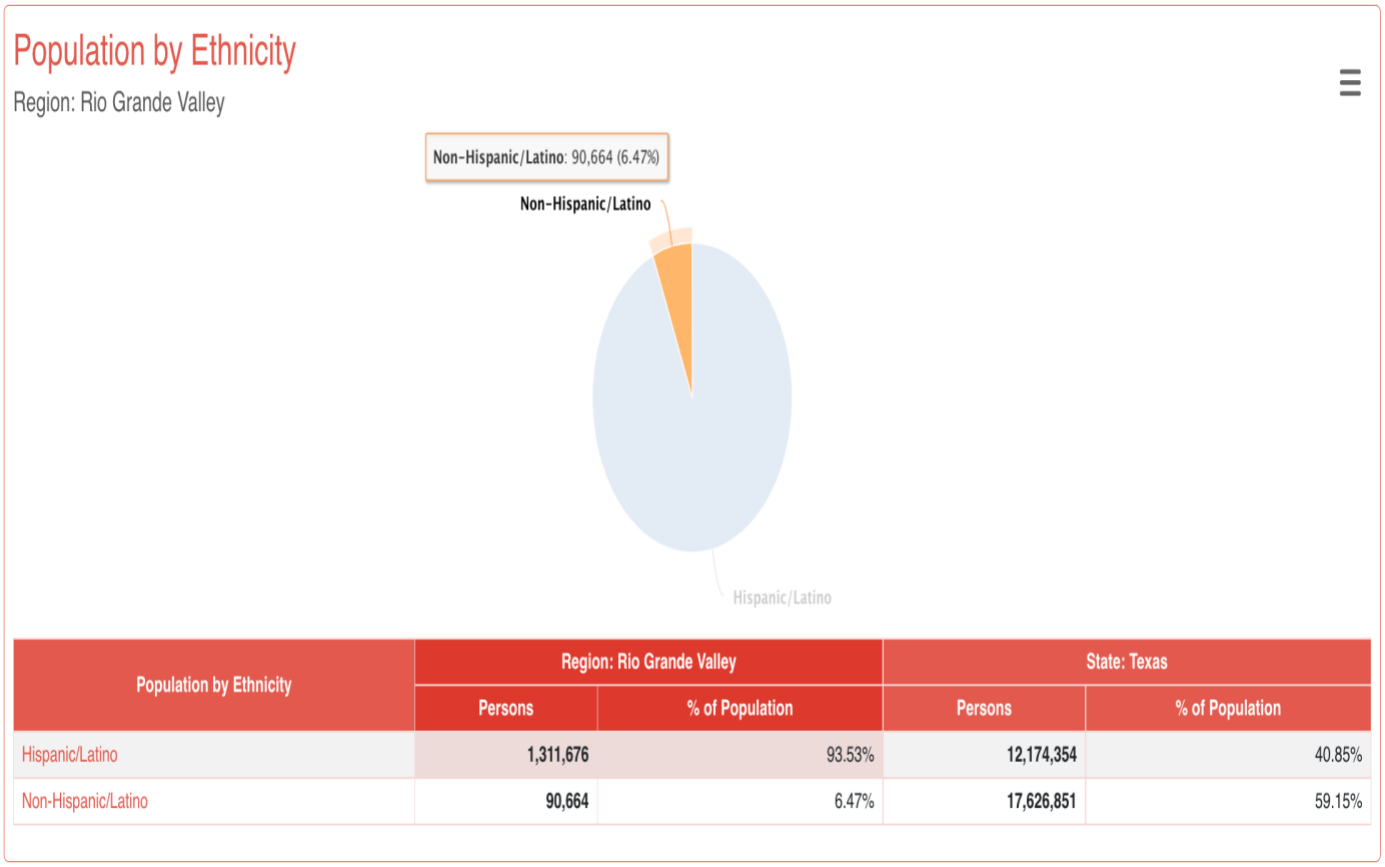
Scania = Diabetes Registry

DIREVA=Diabetes Registry Vaasa.

Appendix D

Population by Ethnicity in the Rio Grande Valley

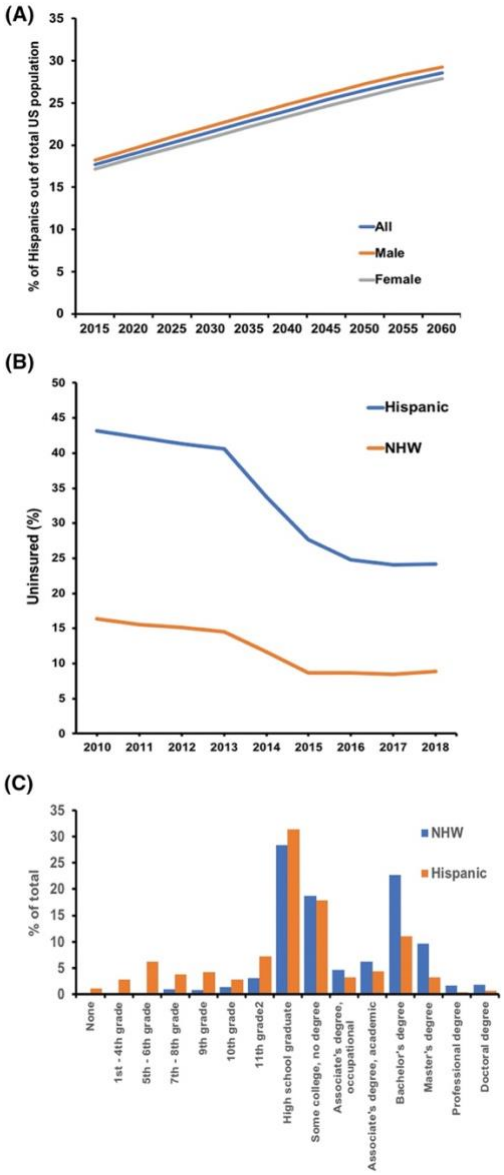
(Connect RGV, 2022)



Population by Ethnicity	Region: Rio Grande Valley		State: Texas	
	Persons	% of Population	Persons	% of Population
Hispanic/Latino	1,311,676	93.53%	12,174,354	40.85%
Non-Hispanic/Latino	90,664	6.47%	17,626,851	59.15%

Appendix E

Demographics of Hispanics in the US



Demographics of Hispanics living in the United States. A, Percentage of Hispanics out of the total US population. B, Rates of uninsurance among Hispanics and non-Hispanic white (NHW). C, Comparison of education levels between Hispanics living in the United States and NHW

Note: Image taken from Aguayo-Mazzucato et al., 2018.

Appendix F

Pathophysiology of Diabetes Mellitus Type 2

Diabetes Mellitus Type 2 (DMT2) is a disease that by name is known by many, or at the very least by the name type 2 diabetes. Type 1 diabetes is largely an autoimmune issue while type 2 is much less frequently autoimmune in nature. Further the DMT2 is present in many clinics across the country and world and can be considered an epidemic. Further, due to the nature of the disease, treatment and outcome can be widely scattered. One reason for this is due to the fact that in order to receive proper treatment, lifestyle changes need to be made. These changes include certain diets or removal of certain foods and exercise. While there is a genetic factor at play in the pathogenesis of the disease, few actual genes have been linked (Stumvoll, 2005).

Generally speaking, the problem in DMT2 has to do with either peripheral insulin resistance or pancreatic beta cell dysfunction. This first category of insulin resistance is that central obesity leads to increased levels of circulating plasma levels of free fatty acids. These free fatty acids lead to further impaired insulin-dependent glucose uptake into hepatocytes, myocytes, and adipocytes. Therefore, this absence of insulin-dependent inhibition of hepatic glycogenolysis and gluconeogenesis further promotes hyperglycemia. The sequalae of these lead to an eventual complete or nearly complete insulin resistance with continuously declining rates of insulin secretion (Brunton, 2016).

Further, while DMT2 is not completely preventable, there are many steps that can be taken to remove the burden of DMT2 as well as the incidence. Strategies can also be used in clinic at promoting protective lifestyles while also promoting the removal or pro-diabetic lifestyles and behaviors (Kolb and Martin, 2017). This is especially true since some of the risk

factors are well known and completely preventable including family history, being overweight, and physical inactivity (Fletcher, Gulanick, and Lamendola, 2002).