

Type 2 Diabetes and Mental Health: A retrospective analysis of diabetes control among commercial health plan members with comorbid depression or anxiety

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Background

- Depression and anxiety are common comorbid conditions in adults with diabetes.^{1,2}
- Depression has been associated with nonadherence to diabetes treatment and resultant hyperglycemia.^{3,4}
- The majority of patients with diabetes report anxiety related to diabetes management.²
- More severe depression or anxiety has been correlated with poor diet, medication nonadherence, and higher healthcare costs in patients with diabetes.^{5,6}
- SSRIs are preferred over TCAs for the treatment of depression in patients with diabetes based on more favorable glycemic control.⁷

Objectives

- Evaluate the impact of depression and/or anxiety, treated and untreated, on HbA1C among members with type 2 diabetes.
- Characterize the treatments used for depression and/or anxiety among members with comorbid type 2 diabetes.
- Evaluate the adherence to metformin among members with type 2 diabetes.

Methods

- Health plan members with continuous enrollment 1/1/2016-12/31/2018, ≥1 ICD-10-CM diagnosis code of type 2 diabetes mellitus (E11.0-E11.9) during 2016 and ≥1 verified HbA1C value in 2017 and 2018 were included.
- Depression and anxiety diagnoses were identified by ICD-10-CM diagnosis codes (F32-F33, F40-F48).
- Treatments for depression/anxiety were identified using CPT codes for CBT (90791, 90792, 90832-90838, 90847, 90853, 96150-96155) and pharmacy claims for the following medications: SSRI, SNRI, TCA, miscellaneous (trazodone, vortioxetine, bupropion, mirtazapine).
- Treatment was defined as CBT and/or medications for depression and/or anxiety in all three years.
- The cohort was divided into four primary groups with respect to anxiety and/or depression: NoDx/NoTx, Dx/NoTx, Dx/Tx, NoDx/Tx. The Dx/NoTx, Dx/Tx and NoDx/Tx groups were combined into DxAnd/OrTx for further analysis. Groups are defined in Table 1.
- A yearly average HbA1C for each group was used to compare glycemic control in 2017 & 2018. Controlled diabetes was defined as HbA1C ≤7%.
- Metformin adherence was measured by calculating proportion of days covered (PDC) for metformin claims in 2018.

Results

Table 1. Group Descriptions

Abbreviation	Description	n
NoDx/NoTx	No diagnosis of depression and/or anxiety in 2016 and no treatment for anxiety/depression in study period	600
Dx/NoTx	≥1 diagnosis of depression and/or anxiety in 2016 and no treatment for anxiety/depression in study period	30
Dx/Tx	≥1 diagnosis of depression and/or anxiety in study period, with treatment for anxiety/depression each year	242
NoDx/Tx	No diagnosis of depression and/or anxiety in study period with treatment for anxiety/depression each year	37
DxAnd/OrTx	Dx/NoTx, Dx/Tx and NoDx/Tx combined	309

Figure 1. Percent of Members with Controlled Diabetes by Group

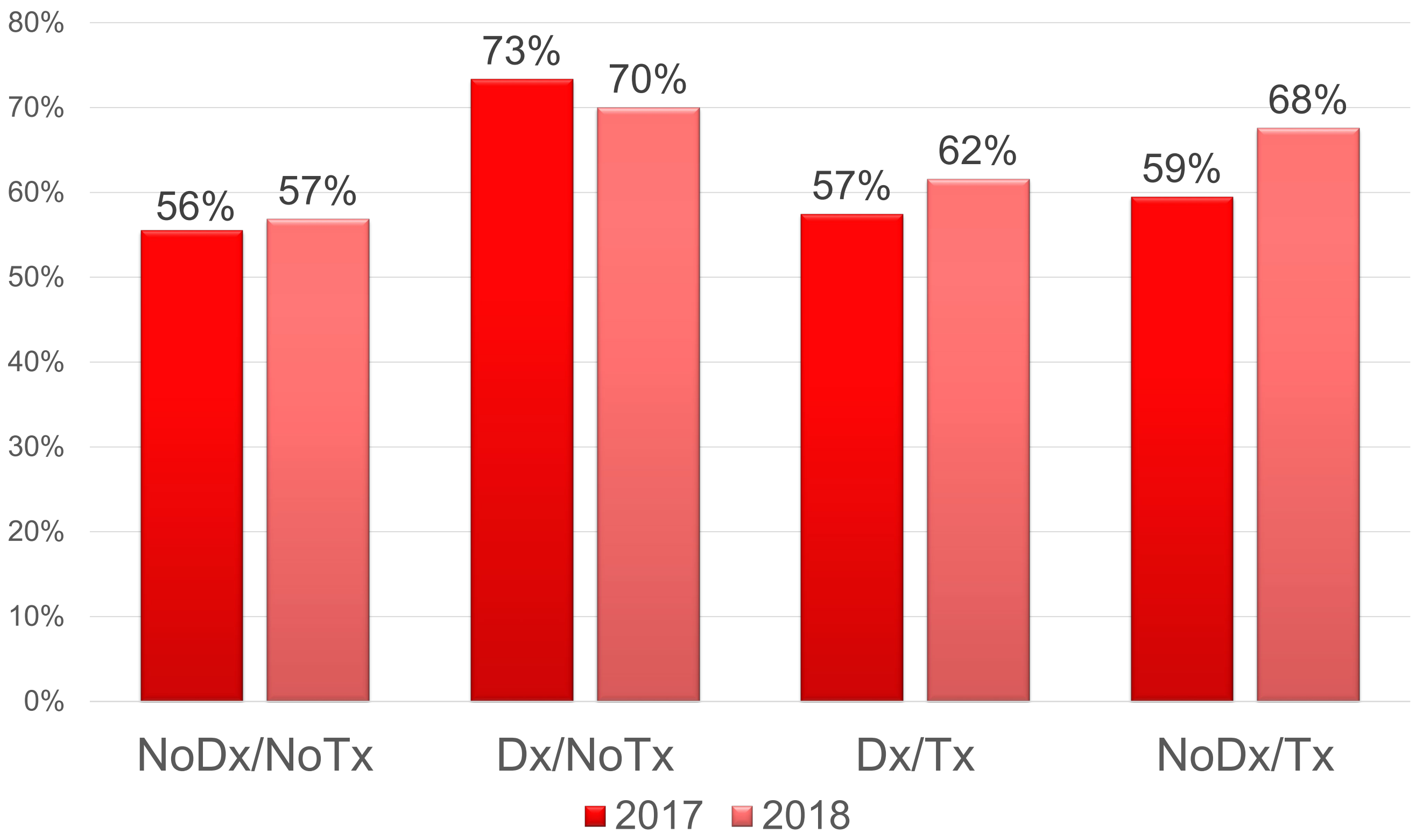


Figure 2. Percent of Members with Controlled Diabetes, Based on Type of Treatment

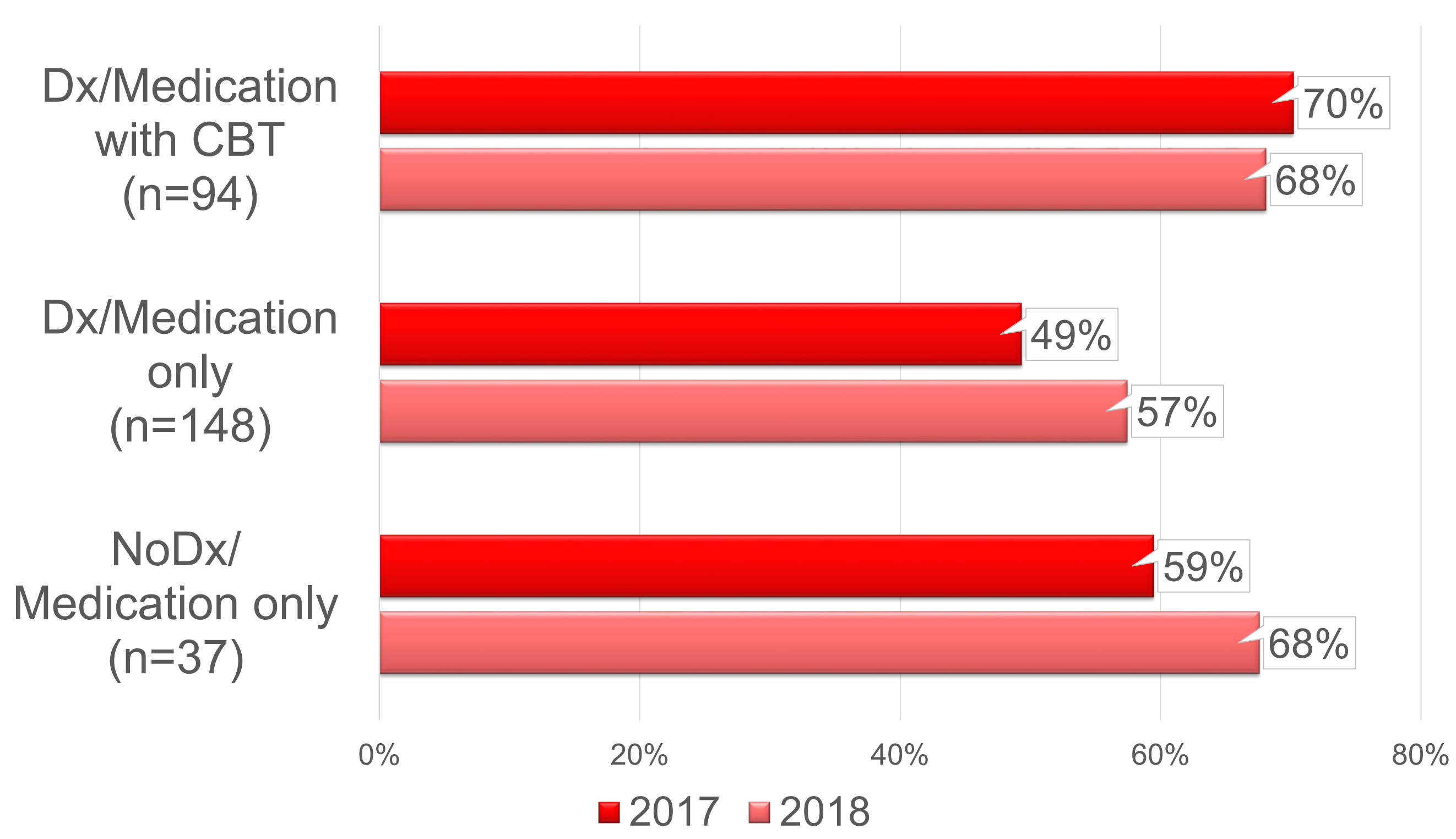


Figure 3. Medications Used for Depression and/or Anxiety Treatments

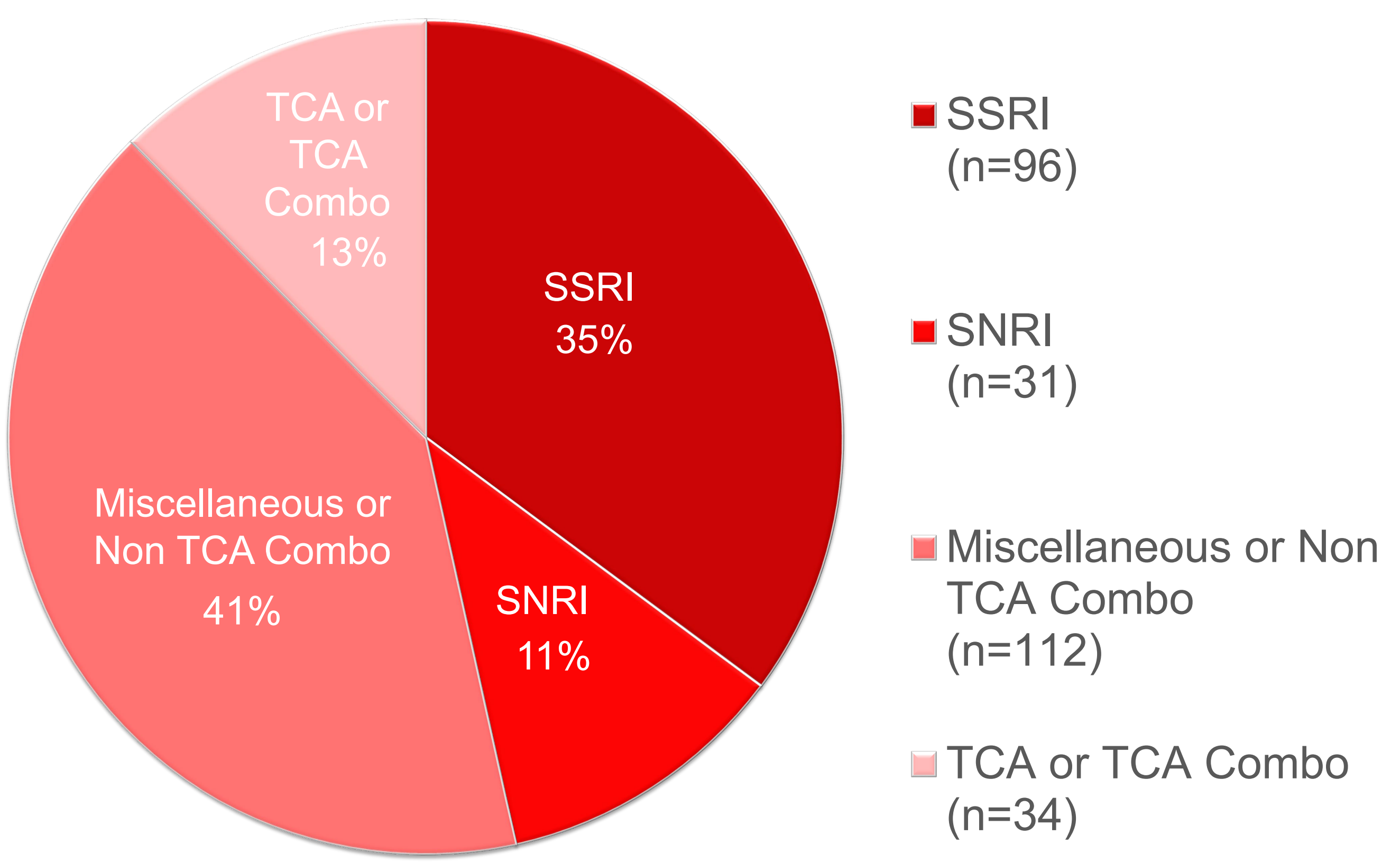


Figure 4. Percent of Members with Controlled Diabetes, Based on Type of Medication

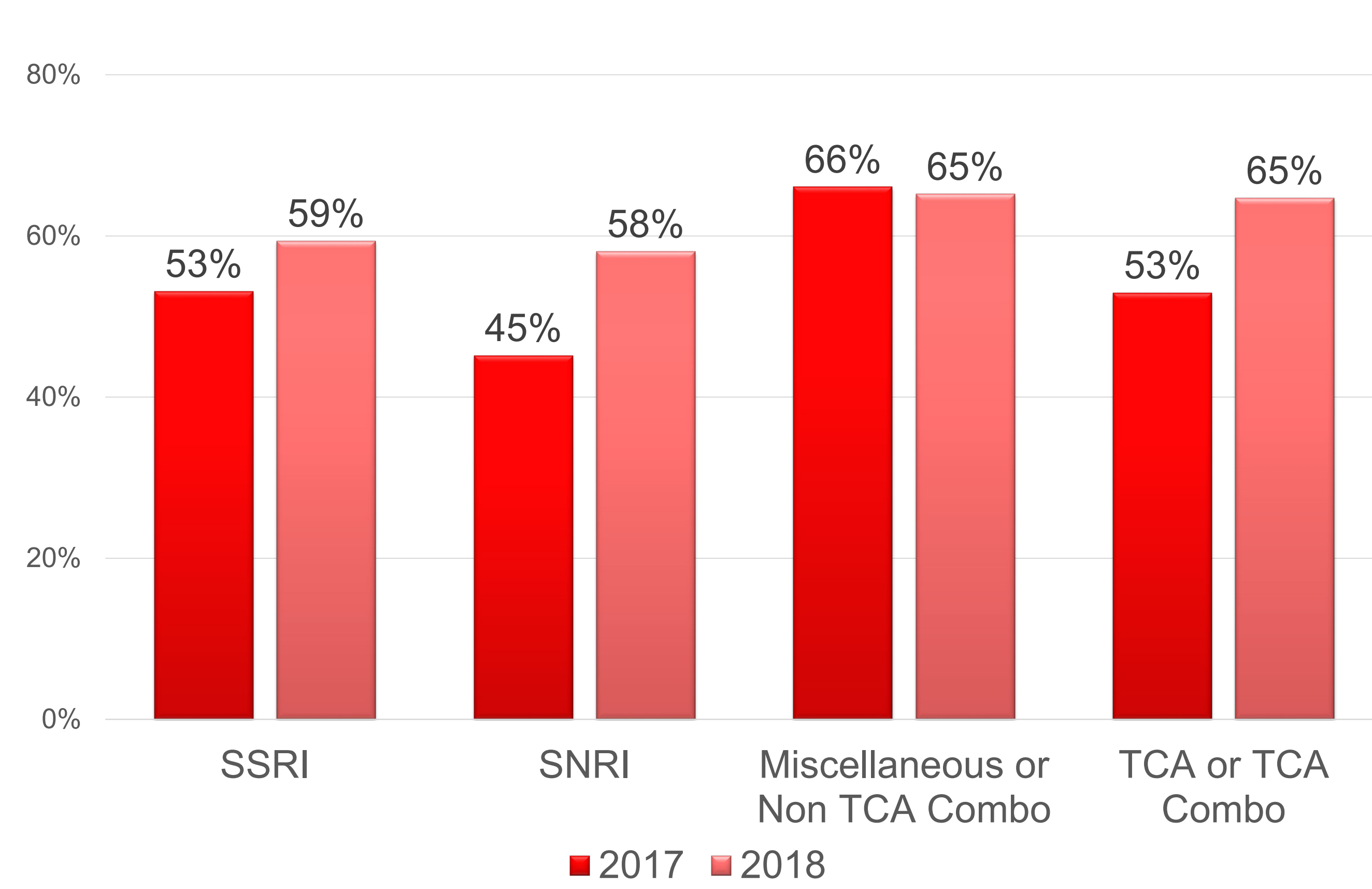
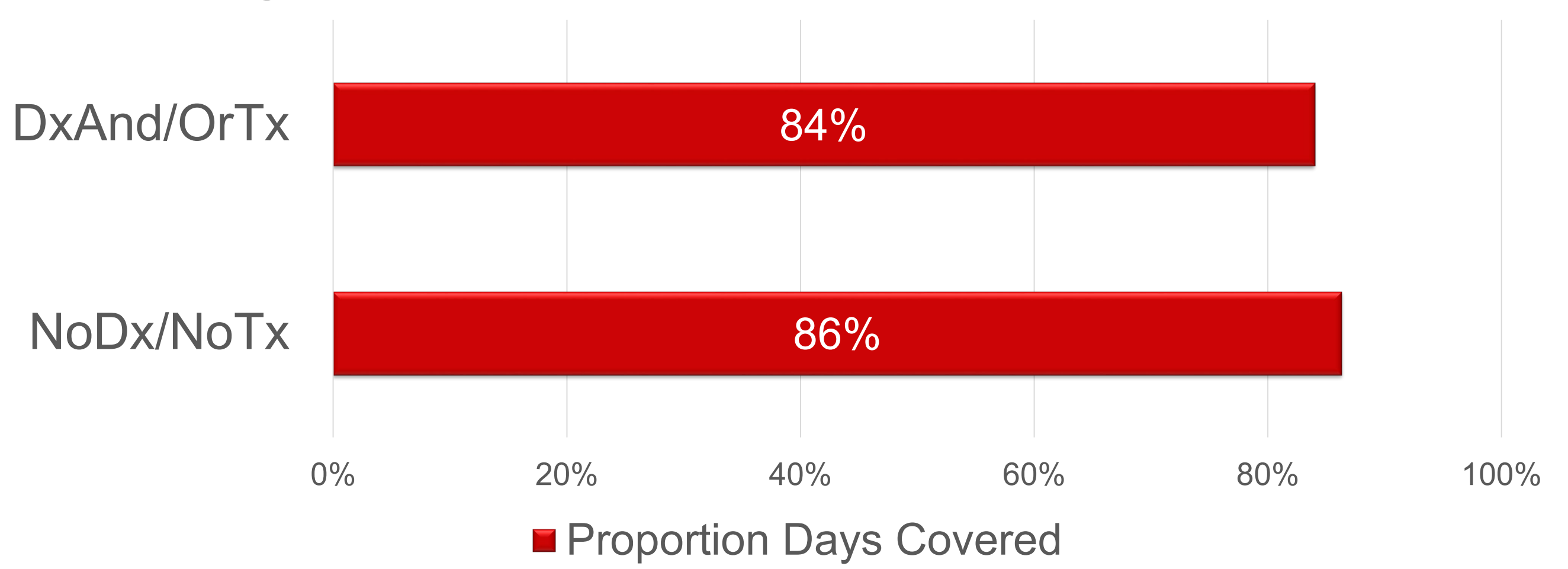


Figure 5. Metformin Adherence Rates in 2018



Discussion

- The Dx/NoTx group had the highest percentage of members with controlled diabetes, but this difference was not statistically significant. More research is needed to determine if there is a relationship between a diagnosis of depression and/or anxiety and glycemic control. [Figure 1]
- Medication combined with CBT for depression and/or anxiety resulted in improved glycemic control compared to medication alone. More research is needed to confirm this effect as previous literature was inconclusive. [Figure 2]
- The SSRI class of antidepressant medications has demonstrated beneficial glycemic control.⁷ This study suggests that most members use a combination of agents to manage depression and/or anxiety. This combination therapy may provide the most benefit for glycemic control. [Figure 3 & 4]
- While not significant, there was reduced metformin adherence in members with depression and/or anxiety compared with those without depression and/or anxiety which is consistent with past studies.⁵ [Figure 5]

Limitations

- The study design did not control for time of diagnosis of depression, anxiety and/or diabetes.
- There was no differentiation within the diagnosis groups amongst those that had depression only, anxiety only, or both depression and anxiety.
- Medications used for the treatment of depression and anxiety can be used outside of mental health.

Conclusions

- Depression and/or anxiety diagnosis and/or treatment did not have a significant effect on glycemic control or metformin adherence among members with type 2 diabetes.
- Future studies are needed to determine if the severity of depression or anxiety or comorbid depression and anxiety has a significant effect on glycemic control and medication adherence.

References

- Roy T, Lloyd CE. Epidemiology of depression and diabetes: A systematic review. *J Affect Disord.* 2012;142 Suppl:8. <https://www.ncbi.nlm.nih.gov/pubmed/23062861>. doi: 10.1016/S0165-0327(12)70004-6.
- Smith KJ, Béland M, Clyde M, et al. Association of diabetes with anxiety: A systematic review and meta-analysis. *J Psychosom Res.* 2013;74(2):89-99. doi: S0022-3999(12)00333-9 [pii].
- Gonzalez JS, Peyrot M, McCarl LA, et al. Depression and diabetes treatment nonadherence: A meta-analysis. *Diabetes Care.* 2008;31(12):2398-2403. <http://care.diabetesjournals.org/content/31/12/2398.abstract>. doi: 10.2337/dc08-1341.
- Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE. Depression and poor glycemic control: A meta-analytic review of the literature. *Diabetes Care.* 2000;23(7):934-942. <http://care.diabetesjournals.org/content/23/7/934.abstract>. doi: 10.2337/diacare.23.7.934.
- Ciechanowski PS, Katon WJ, Russo JE. Depression and diabetes: Impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med.* 2000;160(21):3278-3285. doi: 00072 [pii].
- Deschênes SS, Burns RJ, Schmitz N. Comorbid depressive and anxiety symptoms and the risk of type 2 diabetes: Findings from the lifelines cohort study. *J Affect Disord.* 2018;238:24-31. doi: S0165-0327(18)30164-2 [pii].
- Roopan S, Larsen ER. Use of antidepressants in patients with depression and comorbid diabetes mellitus: A systematic review. *Acta Neuropsychiatrica.* 2017;29(3):127-139. <https://www.cambridge.org/core/article/use-of-antidepressants-in-patients-with-depression-and-comorbid-diabetes-mellitus-a-systematic-review/28A128479C9358BDA78B42C14746CCE0>. doi: 10.1017/neu.2016.54.