



Chronic Kidney Disease Among Montanans with Diabetes

Report Highlights

- Diabetes is a risk factor for chronic kidney disease (CKD).
- From 2016-2018, almost half of hospitalizations (48%) involving diabetes also had CKD.
- Most emergency department (66%) and hospitalizations (76%) involving a person with diabetes and CKD had cardiovascular disease.
- Among emergency department visits of a person with diabetes and CKD, 30% also had end stage renal disease.

Diabetes mellitus (DM) is a lifelong condition that affects the body's ability to convert food into useable energy.¹ An estimated 30 million (9.4%) people in the United States have diabetes.² Roughly 23.8% of those cases are undiagnosed.² In 2018, 9.3% of Montana (MT) adults had diagnosed diabetes.³

Diabetes affects blood vessels by causing high levels of sugar to circulate in the bloodstream. High blood sugar levels force the kidneys to work harder and, over an extended period, can cause permanent damage.⁴ Chronic kidney disease (CKD) is a health condition where damage to the kidneys affects blood filtration, causing excess fluid and waste to circulate through the body.⁵ Untreated, CKD causes early cardiovascular disease (CVD) and kidney failure.⁶

Most of the estimated 37 million CKD cases in the United States are undiagnosed.⁶ Glomerular filtration rate (GFR), a measure of kidney function, is used to diagnose CKD into one of five stages.⁷ Early stages of CKD may have no signs or symptoms at all. The last stage (Stage 5), also known as end stage renal disease (ESRD), is when the kidneys have lost nearly all their filtration ability.⁸ This is when dialysis or a kidney transplant is needed.⁸

Chronically uncontrolled diabetes can require an ED visit or hospitalization.¹⁰ Uncontrolled diabetes can also contribute to the development of CKD.¹¹ This report summarizes emergency department (ED) visits and hospitalizations of Montana residents with a CKD diagnosis among people with diabetes from 2016 to 2018.

Methods

Using SAS, ED visit and hospitalization records for 2016-2018 were selected from the Montana Hospital Discharge Data System (MHDDS).⁹ Records with DM, CKD, ESRD, CVD, and hypertension (HTN) were identified by International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) diagnosis (*Dx*) codes. Data in this report do not represent individual cases. The MHDDS does not contain individual identifiers and cannot be deduplicated. Only MT residents were included in the analyses. Records were excluded if the value for sex was listed as "unknown"; records with a missing value for age or sex were also excluded. Records were flagged if the *Dx* code of interest was found in the Primary *Dx* field or any secondary *Dx* field (1-8). Records were only flagged once for associated disease categories (i.e., records with more than one DM code were only counted once for the DM category. If a record had codes for DM, CKD, and ESRD, the record was counted once in each of the three separate disease categories: DM, CKD, and ESRD).



Results

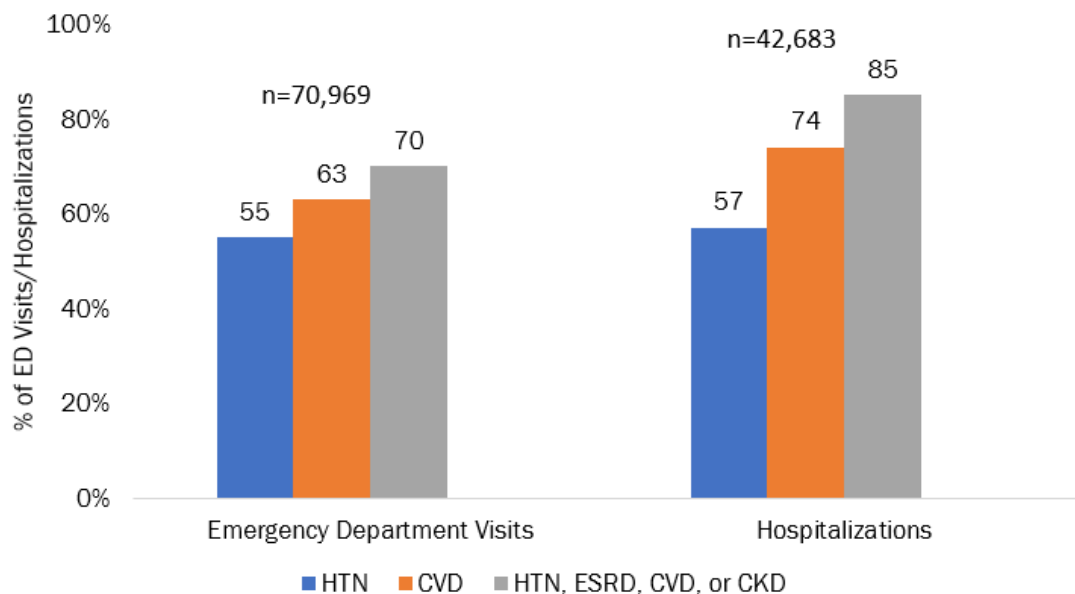
Diabetes-related Emergency Department Visits

- From 2016-2018, 8% of all MT ED visits involved a person with diabetes (PWD). DM Type II accounted for 92% of PWD ED visits; about half (51%) of all PWD ED visits were females.
- Hypertension, which is common among PWD, is also a significant risk factor for CKD. ¹² In Montana, over half (55%) of ED visits among PWD also had a diagnosis of HTN (Figure 1).
- Among ED visits for PWD, 63% also had CVD (Figure 1).
- Seventy percent of ED visits involving a PWD had a comorbidity of CKD, ESRD, CVD, or HTN (Figure 1).

Diabetes-related Hospitalizations

- From 2016-2018, 15% of MT hospitalizations involved a PWD.
- Most hospitalizations involving a PWD had DM Type II (89%); almost half (47%) of the hospitalizations among PWD were females.
- Similar to ED visits, over half of hospitalizations (57%) that involved a PWD also had HTN and 74% had CVD (Figure 1).
- Most hospitalizations (85%) involving a PWD had a comorbidity of CKD, ESRD, CVD, or HTN (Figure 1).

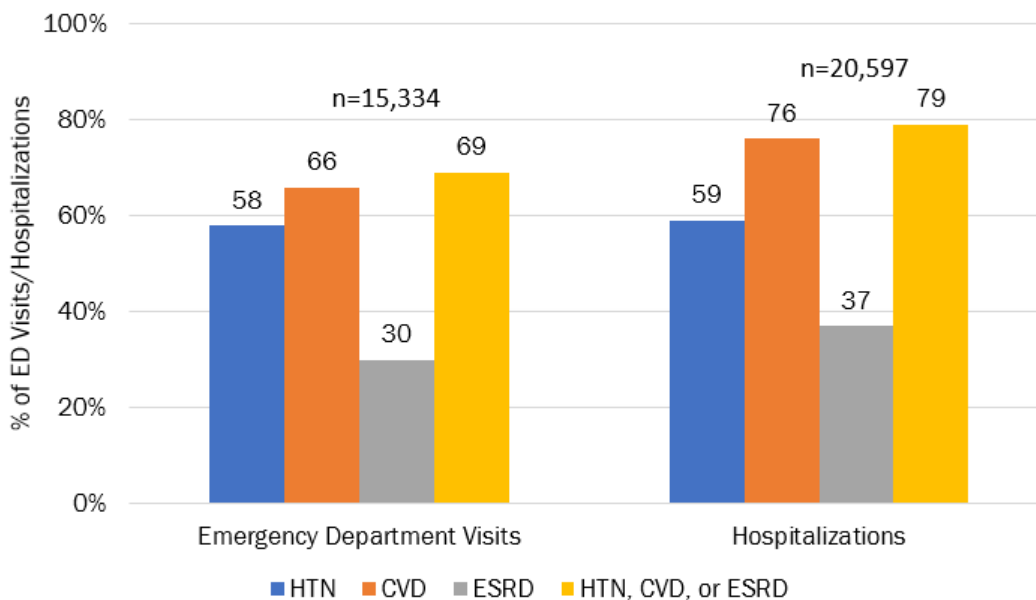
Figure 1: Comorbidities among People with Diabetes
Emergency Department Visits and Hospitalizations
Montana Residents, 2016-2018



Comorbidities among People with Both Diabetes and CKD

- CKD accounted for 3% of all ED visits. Among PWD, CKD accounted for 22% of all ED visits.
- Eighteen percent of Montana hospitalizations involved a person with CKD, while almost half of hospitalizations for PWD had CKD (48%).
- The majority of ED visits for people with both DM and CKD included additional diagnoses for HTN (58%) and CVD (66%). Thirty percent of these visits included an additional diagnosis for ESRD (Figure 2).
- Seventy-six percent of hospitalizations involving a dual diagnosis of DM and CKD also had CVD. HTN diagnoses was found among 59%. Thirty-seven percent of hospitalizations for people with both DM and CKD included a diagnosis for ESRD (Figure 2).

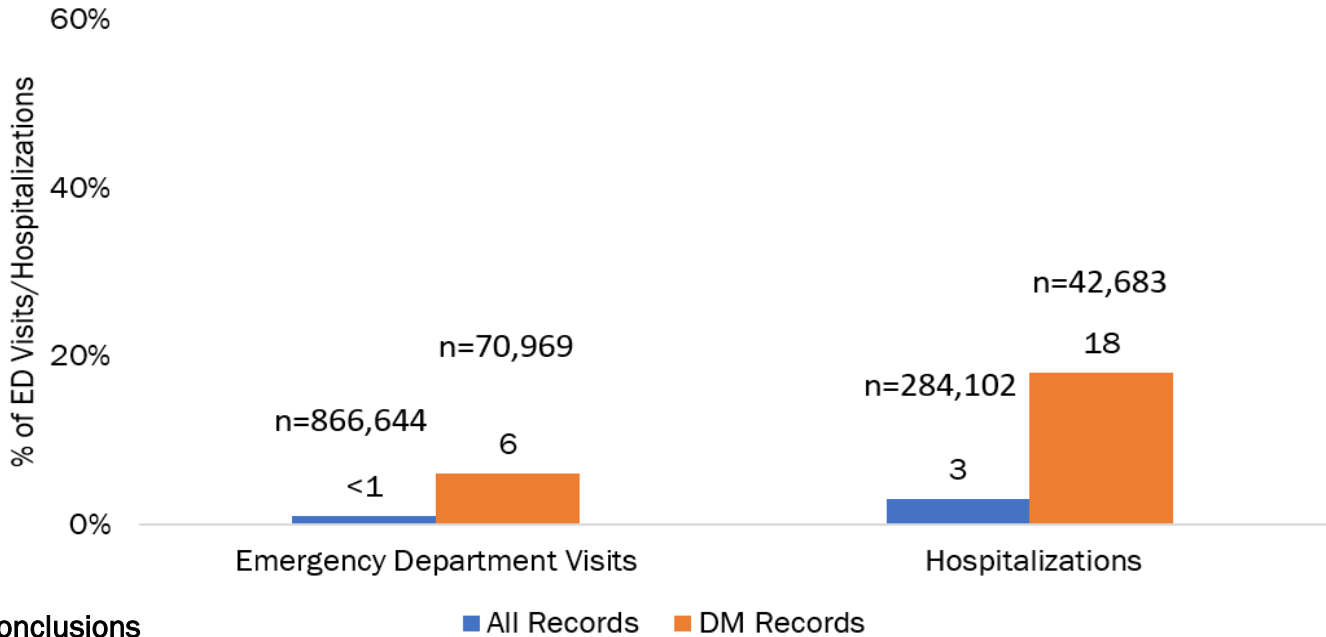
Figure 2: Comorbidities among People with Diabetes and CKD
Emergency Department Visits and Hospitalizations
Montana Residents, 2016-2018



End Stage Renal Disease Emergency Department Visits Among People with Diabetes

- ESRD is the last stage of CKD. Less than 1% of ED visits in Montana had ESRD; however, of ED visits for PWD, 6% had ESRD (Figure 3).
- From 2016-2018, 3% of all Montana hospitalizations had ESRD. Eighteen percent of hospitalizations involving a PWD also had ESRD (Figure 3).

Figure 3: End Stage Renal Disease among People with and without Diabetes
Emergency Department Visits and Hospitalizations
Montana Residents, 2016-2018



Conclusions

From 2016 through 2018, most DM-related ED visits and hospitalizations in Montana included a comorbidity of CKD, HTN, ESRD, or CVD. Over half of Montana ED visits and hospitalizations involving DM also involved HTN. Both HTN and DM are risk factors for CKD. Uncontrolled diabetes may result in the need for emergency care and contribute to CKD development.

The prevalence of CKD is much higher among DM-related ED visits and hospitalizations compared to all Montana visits and hospitalizations for any diagnosis. Screening for CKD in patients with diabetes is important for early detection and prevention of disease progression.

Recommendations

1. Regularly screen patients for prediabetes, diabetes, and CKD, in order to identify and treat these conditions early.
2. Refer patients with diabetes to medical nutritional therapy (MNT) for nutrition care management of their diabetes, which includes strategies for the prevention or delay of CKD in those with diabetes. Refer patients with diagnosed CKD for MNT to help manage or delay CKD disease progression.
3. Refer patients to diabetes-self management education and support (DSMES) at these 4 critical times: at diagnosis, annually (like a DSMES checkup), when the patient's diabetes or health changes, and when there are life transitions. Provide support for personal self-management goals to patients at each visit. Find an educator or program here: <https://arcg.is/KnyzG>



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