

## Allen Blake Case Study Answer Key: Albuminuria and Type 2 Diabetes

### Objectives

1. Student will associate sodium restriction, weight loss, blood pressure control, adequate protein intake, and tobacco cessation with reduced urine albumin excretion.
2. Student will associate use of medications that block the renin-angiotensin-aldosterone system with lower urine albumin levels.

### Background

Mr. Blake is a 36-year-old white male with type 2 diabetes and albuminuria. He is here because his physician said something about “kidney damage.” He states he does not eat breakfast or lunch; however, he stops every morning at a convenience store before work for snacks. He works construction, lives alone, and doesn’t want to cook.

He does not monitor glucose and denies hypoglycemia. Reports frequent urination at night, thirst, fatigue and blurry vision at times. Takes diabetes medication in the morning only, misses second dose most days. He takes all 4 glyburide/metformin tablets at once when his vision is blurred. States blood pressure medication makes him cough and he doesn’t always take it.

He drinks 3 - 4 beers on Friday and Saturday nights. He smokes a pack of cigarettes daily.

Physical exam: obese with mild edema to left leg. Left foot ulcer is healing. No obvious nutrient deficiencies. Reports one tooth is loose, located on upper left. It is painful to chew certain foods.

### MNT Referral Data

Labs: urine-albumin-to-creatinine ratio (UACR) 3,894, creatinine 1.2, eGFR > 60, K 4.2, HCO<sub>3</sub> 25.7, BUN 19, Ca 9.2, Phos 4.0, LDL 72, HDL 40, TG 233, alb 3.0

Medications: glyburide 5 mg/metformin 500 mg 2 tablets twice a day, fosinopril 10 mg daily, baby aspirin, lovastatin 20 mg daily in the evening, ranitidine 150 mg twice a day.

### Recall

2 medium yeast donuts (550 cal, 24 g fat, 404 mg Na, 64 g carb, 8 g pro)	2 ounce bag of potato chips (307 cal, 21 g fat, 272 mg Na, 29 g carb, 4 g pro)	4 sl. meat lovers pizza -reg crust (1,920 cal, 112 g fat, 4,720 mg Na, 148 g carb, 80 g pro)
At least three 32 oz. bottles sports drink – sips all day (475 cal, 0 g fat, 713 mg Na, 118 g carb, 0 g pro)		3 beers (460 cal, 0 g fat, 38 g carb, 5 g pro)

## Review of Pertinent Measures from Health Record

Measure	Aug. 2012	June 2012	Jan. 2012	Jan. 2011
Weight (lb.)	241	246	233	236
Blood Pressure	140/83	130/92	158/87	143/95
Hemoglobin A1C	10.4	10.0	12.0	9.6
UACR	3,894		2,678	

### Questions and Answers

For additional information, see noted slides from **Chronic Kidney Disease 101: Nutrition Intervention**, available at <http://nkdep.nih.gov/resources/ckd-101-nutrition-508.ppt>.

**1. What is the key finding indicating Mr. Blake has chronic kidney disease?**

Use NKDEP's *How well are your kidney working? Explaining your kidney test results*:  
<http://www.nkdep.nih.gov/resources/explaining-kidney-test-results-508.pdf>

**Answer:** His urine albumin-to-creatinine ratio is very high at 3,894, indicating significant kidney damage.

*For additional information, see slides 11, 20, 21.*

**2. Which best describes the clinical significance of elevated urine albumin excretion, as measured by the urine albumin-to-creatinine ratio (UACR)?**

Use NKDEP's *Quick Reference on UACR and GFR*:  
<http://www.nkdep.nih.gov/resources/quick-reference-uacr-gfr-508.pdf>

**Answer:** a. Elevated urine albumin excretion is associated with increased mortality and may be associated with more rapid progression to kidney failure.

*For additional information, see slides 18, 19, 23.*

**3. List interventions that may lower urine albumin levels.**

**Answer:** Use of medications that block the renin-angiotensin-aldosterone system such as angiotensin converting enzyme inhibitors and angiotensin receptor blockers, blood pressure control, sodium restriction, weight loss, adequate not excessive protein intake, and tobacco cessation may lower urine albumin.

*For additional information, see slides 27 (notes), 36, 37, 81*

**4. What is the priority nutrition intervention to slow progression of kidney disease for Mr. Blake?**

**Answer:** Sodium restriction is key to blood pressure control and may reduce urine albumin excretion. His current intake of sodium exceeds 2,300 milligrams sodium. Weight loss would also be beneficial. His diabetes is not well controlled; however, controlling diabetes may not have as great an effect on slowing progression of CKD for him compared to blood pressure control. He already has significant kidney damage. Increasing dietary protein is not indicated in someone with significant albuminuria.

*For additional information, see slides 25 (notes), 27, 36, 80.*

**5. List at least 3 diet changes to recommend to him.**

Use NKDEP's *Eating Right for Kidney Health*: <http://nkdep.nih.gov/resources/eating-right-508.pdf>

**Possible Answers:**

- Instruct on how to read the Nutrition Facts label for serving size and sodium so he can make informed choices about his food.
- Buy fruit in season at grocery store and take 2 pieces to work instead of eating donuts and chips.
- Buy the smaller bag of chips instead of the larger grab bag. Choose donuts less often.
- Buy unsalted nuts at grocery store and take small snack bag to work to eat with fruit.
- Choose vegetable pizza instead of meat lovers' pizza and eat 2 slices instead of 4.

**6. Per his report, he does not adhere to his medication regimen. Which of the prescribed medications is considered reno-protective? Describe the benefit of this medication for Mr. Blake.**

**Answer:** *Fosinopril* controls blood pressure and lowers urine albumin.

*For additional information, see slides 25 (notes), 81.*

## Wrap Up

Based on the explanation of urine albumin, he is worried about his kidneys and now more aware of the importance of controlling blood pressure, smoking, medications and diet. He still hasn't accepted the diagnosis of diabetes. He is not interested in monitoring blood glucose levels. He plans to read Nutrition Facts to find snacks that are lower in sodium and fat, and he plans to take all of his medications more consistently. He is not ready to quit smoking. He will make a dental appointment.

### 7. Write the note for documenting the visit

#### Answer:

A.	36 yo male, type 2 diabetes with albuminuria x 3 yrs. Ht 68", Wt 241# Pertinent labs: UACR 3,894, A1C 10.4, Alb 3.0. Diet recall analysis per day: over 6,000 mg Na, 92 g protein. Takes glyburide/metformin combination in AM and misses 2nd dose. On fosinopril but does not take routinely because it makes him cough. Does not monitor glucose, denies hypoglycemia.
D.	Excessive sodium intake related to high sodium food choices as evidenced by diet recall's nutrient analysis estimated intake of > 6,000 mg Na intake compared to recommendations of < 2,300 mg Na.
I.	Nutrition education, priority modification and relationship to health and disease: Low sodium diet and relationship to controlling blood pressure and slowing CKD progression. Health belief model. Notify provider about cough. ACE inhibitor use may induce dry cough, and patient is not taking medication as prescribed. Recommended dental appointment to assess loose tooth. Information about cough: <a href="http://www.ndep.nih.gov/media/Drug_tables_supplement.pdf">http://www.ndep.nih.gov/media/Drug_tables_supplement.pdf</a> (page 6).
M&E	Short term: Ask patient to repeat back important details / changes that can be made. Long term: Recheck diet recall in future. Monitor albumin and UACR for improvement.

## Follow Up with Mr. Blake

Mr. Blake returns for his 2-month follow-up appointment. He reports he uses Nutrition Facts labels to choose foods with less sodium. He still has trouble taking medications consistently, but he takes them more often. His doctor told him his blood pressure, A1C, and weight are lower. He denies low blood sugars, and reports he now sleeps through the night and has more energy. He is thinking about quitting smoking. His dentist removed the loose tooth and he reports no mouth pain.

His co-worker is losing weight by eating a high protein diet and he wants to know if this would help him lose weight.

## Review of Pertinent Measures from Health Record

Measure	Oct. 2012	Aug. 2012
Weight (lb.)	230	241
Blood pressure	130/78	140/88
Hemoglobin A1C	9.4	10.4
UACR	2,333	3,894

Current labs: Creatinine 1.1, eGFR > 60, K 4.4, HCO<sub>3</sub> 26.0, BUN 18, Ca 9.3, phos 3.9, alb 3.5, hemoglobin 16.0

Previous labs: Creatinine 1.2, eGFR > 60, K 4.2, HCO<sub>3</sub> 25.7, BUN 19, Ca 9.2, Phos 4.0, alb 3.0, LDL 72, HDL 40, TG 233

Annual lipid panel and UACR are scheduled for next visit. No data are available for iPTH or Vitamin D.

## Additional Questions

8. Use NKDEP's *Your Kidney Test Results* (<http://nkdep.nih.gov/resources/kidney-test-results-508.pdf>) and highlight positive changes in data for Mr. Blake.

### Answer:

- UACR now 2,333; was 3,894
- Blood pressure now 130/78; was 140/88
- Serum albumin now 3.5; was 3.0
- A1C now 9.4; was 10.4

*To see how the Your Kidney Test Results "Report Card" might be used to highlight positive changes in data during a consultation with Allen Blake, see <http://nkdep.nih.gov/resources/kidney-test-results-508.pdf>*

**9. Briefly explain why a high protein diet is not recommended for someone like Mr. Blake.**

**Answer:** Dietary protein is a source of nitrogen, phosphorus, potassium, and metabolic acids that require filtration and excretion by the kidneys. Intake of animal protein may be a risk factor for increased urine albumin excretion for people with diabetes and hypertension. Excessive protein intake may accelerate CKD progression in humans. Mr. Blake has diabetes, hypertension, and significant albuminuria, and a high protein diet may exacerbate kidney damage for him.

*For additional information, see slides 36, 37, 39, 40.*

**Educational Material**

National Kidney Disease Education Program. *Urine Albumin-to-Creatinine Ratio (UACR) in evaluating patients with diabetes for kidney disease.* Washington, D.C.: U.S. Government Printing Office; February 2010. NIH Publication No. 10–6286.

<http://www.nkdep.nih.gov/resources/quick-reference-uacr-gfr-508.pdf>

National Kidney Disease Education Program. *How well are your kidneys working? Explaining your kidney test results.* Revised February 2012. NIH publication 12–6220. National Kidney Disease Education Program website.

<http://nkdep.nih.gov/resources/explaining-kidney-test-results-508.pdf>

National Kidney Disease Education Program. *Eating right for kidney health.* Revised September 2011. NIH publication 11–7405. National Kidney Disease Education Program website. <http://nkdep.nih.gov/resources/eating-right-508.pdf>

National Kidney Disease Education Program. *Your kidney test results.* Revised September 2011. NIH Publication No. 11–7407. National Kidney Disease Education Program website. <http://nkdep.nih.gov/resources/kidney-test-results-508.pdf>

## Additional Reading

Afshinnia F, Wilt TJ, Duval S, Esmaeili A, Ibrahim HN. Weight loss and proteinuria: systematic review of clinical trials and comparative cohorts. *Nephrology Dialysis Transplantation*. 2010;25(5):1173–1183.

Jones-Burton C, Mishra SI, Fink JC, et al. An in-depth review of the evidence linking dietary salt intake and progression of chronic kidney disease. *American Journal of Nephrology*. 2006;26(3):268–275.

Verhave JC, Hillege HL, Burgerhof JGM, et al. Sodium intake affects urinary albumin excretion especially in overweight subjects. *Journal of Internal Medicine*. 2004;256(4):324–330.

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Bernstein AM, Treyzon L, Li Z. Are high-protein, vegetable-based diets safe for kidney function? A review of the literature. *Journal of the American Dietetic Association*. 2007;107(4):644–650.

Orth SR, Hallan SI. Smoking: A risk factor for progression of chronic kidney disease and for cardiovascular morbidity and mortality in renal patients—absence of evidence or evidence of absence? *Clinical Journal of the American Society of Nephrology*. 2008;3(1):226-236.

National Institutes of Health National Diabetes Education Program. *Diabetes Medications Supplement Working Together to Manage Diabetes*. Revised 3/07. NDEP– 54–S, 2007. [http://ndep.nih.gov/media/Drug\\_tables\\_supplement.pdf](http://ndep.nih.gov/media/Drug_tables_supplement.pdf)



For more information, visit [www.nkdep.nih.gov/nutrition](http://www.nkdep.nih.gov/nutrition) or call 1-866-4 KIDNEY (1-866-454-3639).

*The National Kidney Disease Education Program (NKDEP) works to improve the understanding, detection, and management of kidney disease. NKDEP is a program of the National Institutes of Health (NIH). NKDEP is a program of the National Institutes of Health.*

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