AGRICULTURAL WORKERS IN GUATEMALA WITH CHRONIC KIDNEY DISEASE ARE AT INCREASED RISK OF ACUTE RESPIRATORY ILLNESS, AND COVID-19 VACCINATION IS ASSOCIATED WITH REDUCED ILLNESS AND ABSENTEEISM

Jenae Stuzman[3*], Molly M. Lamb[1*], Diva M. Calvimontes[2], Neudy Rojop[2], Kareen Arias[2], Wanda Mejia,[2] Chelsea Iwamoto[4], Julio del Cid-Villatoro[2], Claudia Paiz[2], Lyndsay Krisher[5], Jose Monzon[6], Blair Weikel,[1] Aditi Bunker[7], Guillermo Antonio Bolanos[2], Ashley Fowlkes[4], Emily Zielinski Gutierrez[6], Eduardo Azziz-Baumgartner[4], Edwin J. Asturias,[1,2,3] Lee S. Newman,[1,5] Daniel Olson[1,2,3]

INTRODUCTION:

- Chronic kidney disease of unknown origin (CKDu) is recognized as an emerging public health concern and occurs outside of traditional CKD risk factors
- CKDu affects Central American agricultural workers
- It is unknown whether affected workers are at increased risk of respiratory illness severity as they are with traditional CKD

PURPOSE:

- The purpose of our study was to establish the prevalence of CKD in our Guatemalan cohort and to establish whether affected workers are at increased risk for respiratory illness
- Hypothesis: CKDu, like other forms of CKD, is associated with greater risk of ILI.

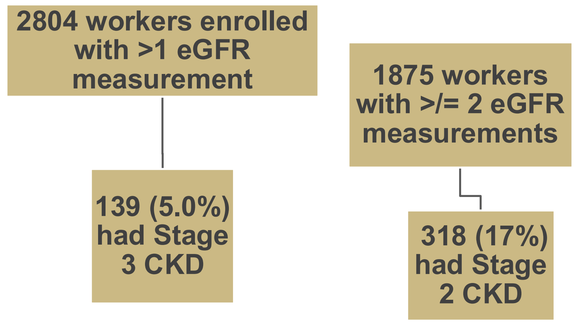
METHODS:

- Prospective cohort study (AGRI study) of workers at a single banana plantation from June 2020 to September 2024
- Eligible workers were followed for influenza-like illness (ILI).
- Workers with ILI were tested for influenza, RSV, and SARS-CoV-2 by RT-PCR testing
- Serum creatinine was collected at enrollment and annually, in addition to acute-illness visits, and used to calculate estimated glomerular filtration rate (eGFR)

METHODS CONT:

- COVID-19 vaccination data were collected from the Guatemalan national vaccine registry.
- Descriptive statistics and multivariable regression models were used to calculate CKD prevalence as well as association with ILI, COVID-19, and vaccination in the overall cohort, and a sub-cohort with ≥2 eGFR measurements.

RESULTS:



- **Risk factors** factors for Stage 2 and Stage 3 CKD included older age, male sex, field worker status, longer job tenure, and living in a municipality with higher mean heat index.
- Participants with Stage 3 CKD were **more likely to have ILI** (adjusted relative risk [aRR]=1.71, 95% confidence interval [CI]=1.19-2.46) and SARS-CoV-2-positive (SCV2+) ILI (aRR=2.03, CI=1.09-4.88).
- COVID-19 **vaccination was protective** against ILI (aRR=0.40, CI=0.34-0.47), and against SARS-CoV-2 (aRR=0.28, CI=0.18-0.42).
- ILI and SCV2+ ILI were associated with 705 and 381 days of absenteeism, respectively.
- COVID-19 was associated lower risk of prolonged (>5 days) absenteeism (22.1% vs 42.7%, p=0.0014).
- **COVID-19 vaccination was associated with reduced ILI-associated absenteeism** in the overall cohort (0 vs 1 day, p-value=0.0003), and among workers with Stage 2 (0 vs 5 days, p=0.001) and Stage 3 (1 vs 3.5 days, p=0.11) CKD.

LIMITATIONS:

- Our CKD testing did not meet the consensus definition of CKDu
- Due to fewer influenza cases during the COVID-19 pandemic, we were underpowered to evaluate the potential benefit of influenza vaccination
- Mild ILI was likely underreported

CONCLUSIONS:

- We found a high burden of CKD, and likely CKDu, in our otherwise healthy and young banana worker cohort.
- Workers with CKD were more likely to report respiratory illness (ILI) and COVID-19 than their healthy peers
- Work-based COVID-19 vaccination was associated with a significant reduction in all-cause respiratory illness and COVID-19
- Further investigation warranted on CKDu regarding infection risk and benefit of workplace vaccination

DISCLOSURES: DO receives grant funding from Roche, Merck, and Sanofi Pasteur. MML receives grant funding from Merck.

REFERENCES: Johnson RJ, Wesseling C, Newman LS. Chronic Kidney Disease of Unknown Cause in Agricultural Communities. N Engl J Med. 2019;380(19):1843-52.

SUPPORT: This work is funded by the NIH/NIAID 1K23AI143967, CDC-CAR/CGH CDC_GH002243, and Investigator-initiated contributions by Roche Diagnostics and Sanofi Pasteur.

AKNOWLEDGEMENTS: We thank the following for their contributions to this research: CU Trifinio Research Team, the CU Center for Global Health administration, the Centers for Disease Control and Prevention, AgroAmerica, and most importantly, the research participants.

*co-first authors