Clinical Safety & Effectiveness
Cohort # 13

Improving hepatitis B vaccination rate in the Chronic Kidney Disease (CKD) patient population being treated at the Texas Diabetes Institute

Educating for Quality Improvement & Patient Safety
The Team

• Division
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  – Connie Castillo, RN Texas Diabetes Institute
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  – Tony Herron, MHA Director, Ambulatory Services, TDI
  – Theresa de la Haya, RN, MPH, Sr. VP, CH&CPP, UHS
  – Chandandeep Takkar MD, Nephrology, UTHSCSA
  – Hema Manickam MD, Nephrology, UTHSCSA
  – Facilitator: Hope Nora, PhD

• Sponsor Department: (Medicine) Nephrology
Aim Statement

• The aim of the project is to improve the number of chronic kidney disease patients vaccinated (starting series 1) for hepatitis B at the Texas Diabetes Institute (TDI) Friday Renal Clinic from the current rate of 10.5% to 80% by January 10, 2014.
Project Milestones

- Team Created 8/31/13
- AIM statement created c. 9/13
- Weekly Team Meetings 9/6/13 – 1/10/14
- Background Data, Brainstorm Sessions, Workflow and Fishbone Analyses 8/8/13- 11/15/13
- Interventions Implemented 10/18/13
- Data Analysis 11/20/13, 1/3/14
- CS&E Presentation 1/17/14
- Graduation Date
Background: KDOQI guidelines

- All adults who are at high risk of progression of CKD and have GFR < 20 mL/min/1.73 m² should be immunized against hepatitis B and the response confirmed by serological testing.
Background

Chronic hepatitis B is a risk factor for liver failure, cirrhosis and liver cancer.

Approximately 620,000 people die annually from hepatitis B virus-related liver disease.

Hepatitis B vaccination is an effective intervention in preventing this infection.

The UH has 5 dialysis units. The number of patients that are non-responders to vaccination is not insignificant. In the end of 2013, I obtained the numbers of current non-responders or those patients currently receiving vaccinations. (Optimally, chronic kidney disease patients should have already been vaccinated prior to initiation of dialysis.) University Hospital Northwest had 12 non-responders out of a total of 121 patients. Among the total, 45 patients were in the process of being vaccinated. University Hospital Southeast had 22 patients with titers < 10 IU/L out of 88 total patients. University Hospital West had 21 patients with titers < 10 IU/L out of 147 patients. This translated into 100 patients with sub-goal titers out of 356 total patients, i.e. 28%.

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5708a1.htm
Primary Seroconversion in ESRD is Poor

• While on dialysis, 76.7% of patients who receive hepatitis B vaccination will seroconvert with an antibody titer > 10 IU/L

• However, only 53.5% will have an adequate response (i.e., titer > 100 IU/L).

In healthy individuals, only 5-10% fail to seroconvert. In ESRD this increases to 20-40%
Past Work Process: Hepatitis B Immunization in CKD Patients

- Patient
  - Fellow encounter
    - Lab review
      - eGFR
        - Stage 4 or 5 disease
          - Test further
            - Don’t test further
              - Offer vaccine
                - Patient Accepts
                - Patient Declines
        - CKD is stage 3 or better
          - Patient immune
          - Patient not immune
Texas Diabetes Institute
Pre-Intervention HepB Vaccination Rate for Stage 4 and 5
CKD Patients

Vaccination Rate

July 2012 thru June 2013

Vaccination Rate

July 2012 thru June 2013
Obstacles for Vaccination

Data were obtained from faculty, fellows, and staff at the Friday TDI clinic. I grouped the main categories of my fishbone, and asked which was the most important. System 6, Provider 5, Patient 4, Technology 3 and other 1 as of 11/16/13.
Intervention

Plan

1. Obtain baseline data
   - Obtain IDX data in spreadsheet fashion
   - Meet with IT (Lisa Wammack, Dr. Powell) to obtain data
   - Analyze data for Hep B vaccination, Hep B S Ab titre level

2. Nurse practitioner assumes responsibility for the clinic’s patient vaccination status
   - Patients are screened for CKD stage, proteinuria/albuminuria stages prior to clinic
   - Orders are ready prior to the clinic day
   - Have vaccine ready prior to clinic
Implementing the Change

Do

• Patients were screened for CKD 4,5 prior to the clinic (i.e., absolute indication for vaccination)

• Orders written (by NP) prior to encounters

• Clinic staff (RNs) planned to provide vaccinations (ordered from pharmacy)
New Work Process: Hepatitis B Immunization in CKD Patients

NP

Lab review

eGFR

Stage 4 or 5 disease

Patient immune

Patient not immune

Offer vaccine

Patient Accepts

Patient Declines

CKD is stage 3 or better

Patient not immune

patient
Texas Diabetes Institute
Pre and Post Intervention Vaccination Rates for CKD Stage 4 and 5 Patients
## Return on Investment

### Costs of vaccination in CKD clinic

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<th>vaccine</th>
<th>cost</th>
<th>clinic</th>
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$704.00 Total

### Costs of vaccination in dialysis unit

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$1,404.00 Total

There are 100 patients in the UH dialysis units with titers < 10 IU/L. Successful immunization in the outpatient clinics could translate into a difference of $70,200 without purchasing new software and without hiring new staff.

If an individual fails to seroconvert, surveillance hepatitis B surface antibodies need to be measured monthly, translating to $1,404 annually per patient (not to mention the costs borne when a patient becomes afflicted with chronic hepatitis B infection – isolation dialysis, additional co-morbidity and risk of progressive liver disease, alteration in transplant status).
Conclusion/What’s Next

1. From 7/1/12 to 6/30/13, hepatitis B immunization was being initiated in only 11 ± 4% of those who had an absolute indication (i.e., GFR < 30 mL/min/1.73 m²).

2. Our interventions increased this rate to 81 ± 12%.

3. Successful seroconversion will translate into an absolute savings of $700 per patient, and then $1,404 annually for the duration the patient is on hemodialysis if they fail to convert (20-40% of patients).
Thank you!

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