

Incidence and Predictors of Pregnancy in the End-Stage Renal Disease Population

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Introduction

- The incidence of pregnancy in end-stage renal disease has rarely been examined in large populations of childbearing age.
- From survey data, incidence per yr in dialysis patients appears low.
 - 0.3% ('75-96, in Belgium)
 - 1.8% ('85-90, in Saudi Arabia)
 - 0.5% ('92-95, in United States)
 - 0.4% ('96, in Japan)
- Incidence in transplant patients appears higher than in dialysis.
 - Gill *et al* reported 33 per 1000 yr in Medicare transplant patients, between 1990 and 2003.
 - Gill *et al* noted a marked decline from 1995 to 1996, coincident with rising use of mycophenolate mofetil for immunosuppression.
- In this study, we used data from the United States Renal Data System:
 - to estimate trends in pregnancy incidence, from 1992 to 2007.
 - to identify important predictors of pregnancy incidence.
 - to estimate trends in time from transplant to pregnancy.

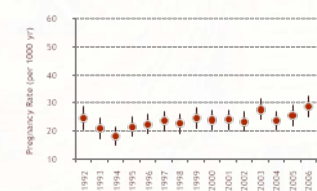
Methods

- For each year, we constructed prevalent cohorts of women:
 - between 20 and 40 yr old;
 - who received dialysis or had a functioning transplant during the final 3 mo of the preceding year;
 - who carried Medicare as primary payer (MPP) during that time.
- Patients were followed from Jan 1 until the earliest of death, modality change, MPP cessation, or Dec 31.
- Incidence of pregnancy was defined by diagnosis and procedure codes in Medicare claims.
 - ICD-9 diagnosis: 630-74, V22-4;
 - ICD-9 procedure: 72-4; HCPCS: 59000-999, H1000-5
 - ≥1 inpatient, ≥2 outpatient, or ≥1 pregnant outcome claim(s)
- Comorbid conditions were assessed from Medicare claims.
- In each of dialysis and transplant patients, pregnancy incidence was modeled with Poisson regression, adjusted for age, race, primary ESRD cause, ESRD duration, comorbid conditions, and year.

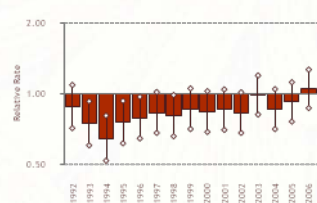
Results

- The cohort included 131,513 dialysis and 69,459 transplant patients.
- In total, there were 2,841 and 2,016 pregnancies in dialysis and transplant patients, respectively.
- In dialysis patients, pregnancy rates modestly increased, from 18.2 per 1000 yr in 1994, to 27.5 in 2007.
- In transplant patients, pregnancy rates decreased between 1992 and 2000, from 53.7 per 1000 yr to 21.7, and since 2000, were roughly constant.
- Adjustment for case-mix and comorbid conditions did not appear to entirely explain these trends.
 - In 2006-7, adjusted rates in dialysis and transplant patients were not significantly different ($p = 0.78$).
- Significant predictors of pregnancy included younger age, black race, Asian race (in transplant), hypertension and glomerulonephritis as primary ESRD causes (in transplant), and lesser ESRD duration (in dialysis).
- Comorbidity, except for liver disease, was not strongly associated with pregnancy in dialysis patients.
- The mean time from transplant to pregnancy was roughly 1.9 years.

Pregnancy Rate in Prevalent Dialysis Patients, 1992-2007
crude rate



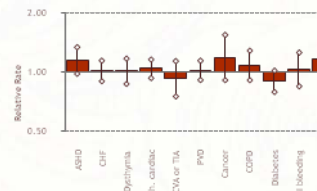
Adjusted Relative Rates of Pregnancy in Prevalent Dialysis Patients, 1992-2007
referent = 2007



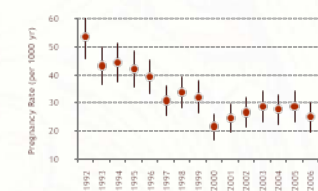
Traits of Prevalent Dialysis Patients Pregnant and Not Pregnant, 1992-2007
means and proportions
Adj. RR: adjusted relative rate

	Pregnant	Not	Adj. RR	p-value
Age (yr)	30.6	32.6	0.93	<0.0001
Race: White	34.9	46.1	1.00	Referent
Race: Black	59.4	47.6	1.56	<0.0001
Race: Asian	3.0	3.8	0.95	0.63
Cause: Diabetes	15.0	19.4	1.00	Referent
Cause: Hypertension	18.7	17.5	1.08	0.37
Cause: Glomerulo.	34.1	29.4	1.16	0.05
Cause: Cystic Kidney	27.7	29.4	0.95	0.50
ESRD duration (yr)	5.2	5.7	0.98	<0.0001

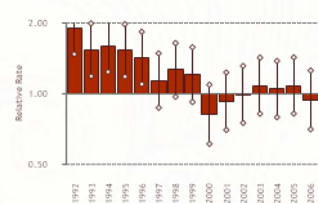
Adjusted Relative Rates of Pregnancy for Comorbid Conditions in Prevalent Dialysis Patients, 1992-2007



Pregnancy Rate in Prevalent Transplant Patients, 1992-2007
crude rate



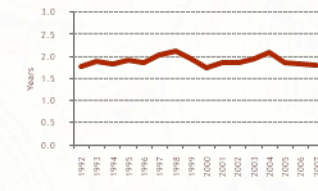
Adjusted Relative Rates of Pregnancy in Prevalent Transplant Patients, 1992-2007
referent = 2007



Traits of Prevalent Transplant Patients Pregnant and Not Pregnant, 1992-2007
means and proportions
Adj. RR: adjusted relative rate

	Pregnant	Not	Adj. RR	p-value
Age (yr)	30.3	32.7	0.93	<0.0001
Race: White	69.5	72.4	1.00	Referent
Race: Black	24.3	22.2	1.13	0.03
Race: Asian	5.0	4.0	1.23	0.05
Cause: Diabetes	18.4	25.5	1.00	Referent
Cause: Hypertension	11.1	10.2	1.30	0.01
Cause: Glomerulo.	36.1	30.7	1.30	<0.01
Cause: Cystic Kidney	29.9	29.0	1.14	0.12
ESRD duration (yr)	6.7	7.2	0.99	0.14

Mean Years between Transplant and Pregnancy, 1992-2007 in patients with Transplant during 3 years preceding follow-up



Conclusions

- Annual pregnancy rates in the ESRD population were lower than in the general population.
- Rates were relatively stable in recent years, following a moderate increase in dialysis patients and a large decrease in transplant patients.
- At the end of the study era, pregnancy rates were similar between dialysis and transplant patients.
- Younger patients, black patients, and those without diabetes were most likely to become pregnant.
- Time from transplant to pregnancy was stable, at nearly 2 years.
- This suggests that the declining rate of pregnancy in transplant patients may not be attributable to postponement of conception until after cessation of post-transplant Medicare coverage.
- Instead, factors precluding pregnancy, including use of immunosuppressant agents, may be more noteworthy.
- Limitations of this study include its uncertain generalizability to the non-Medicare ESRD population, and its use of a non-validated algorithm to identify pregnancy from Medicare claims.