# Parathyroidectomy Rates and Post-operative Mortality in Patients on Kidney Replacement Therapy in Australia and New Zealand

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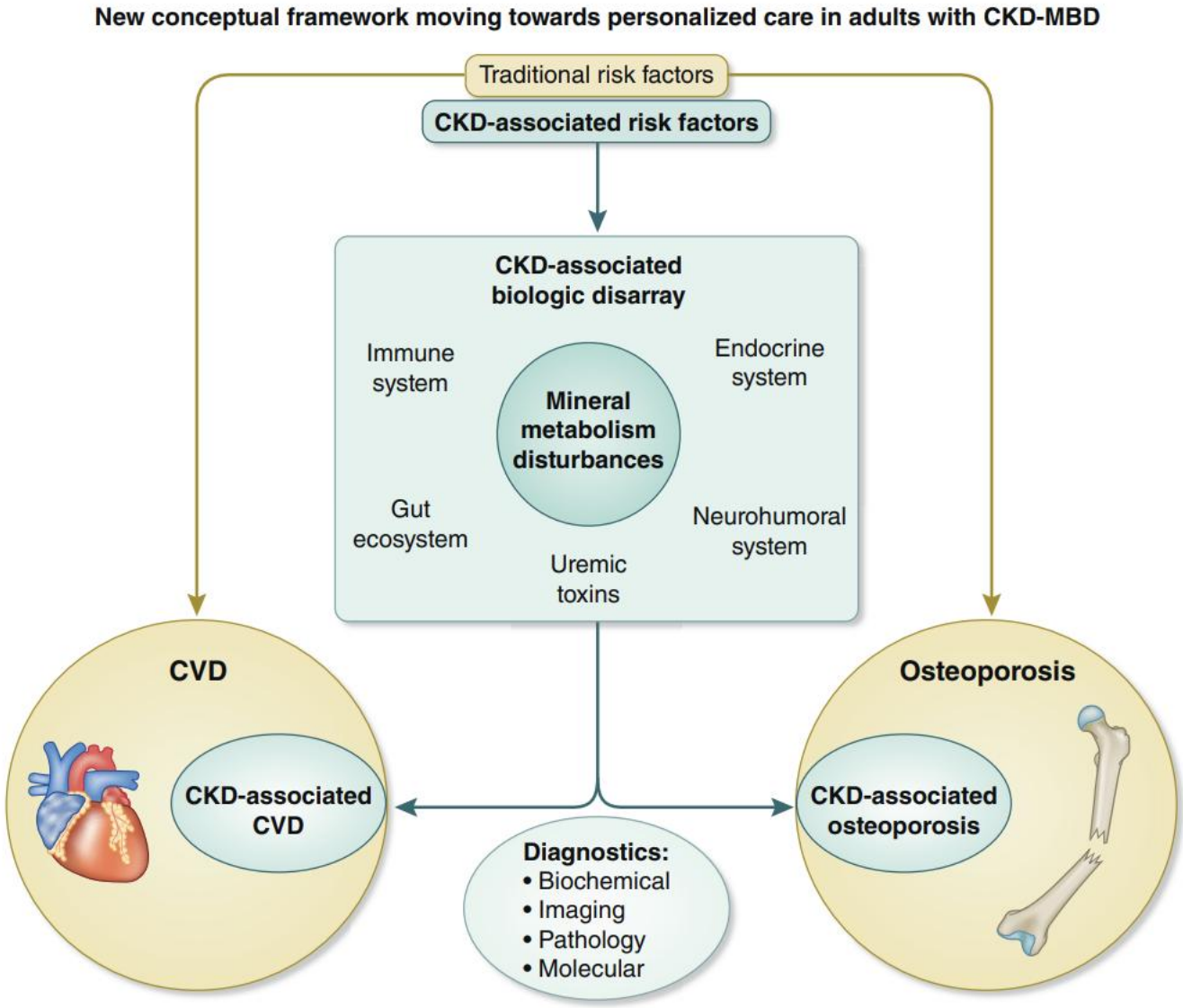
# CKD Mineral Bone Disorder




Ketteler M, Evenepoel P, Holden RM, Isakova T, Jørgensen HS, Komaba H, et al. Chronic kidney disease–mineral and bone disorder: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference. Kidney International [Internet]. 2025 Jan 24;107(3):405–23. Available from: https://www.sciencedirect.com/science/article/pii/S008525382400810X

# Methods

All Kidney Replacement Therapy (KRT) patients 2000-2015

Hospital admission datasets (ICD-10 AM, Australian Classification of Health Interventions)

44,525 unique patients (HD, PD, HHD, KT)

3538 Parathyroidectomy patients

Total parathyroidectomy N= 1891

Subtotal parathyroidectomy N= 1647

*Statistical method: Poisson & Logistic Regression.*

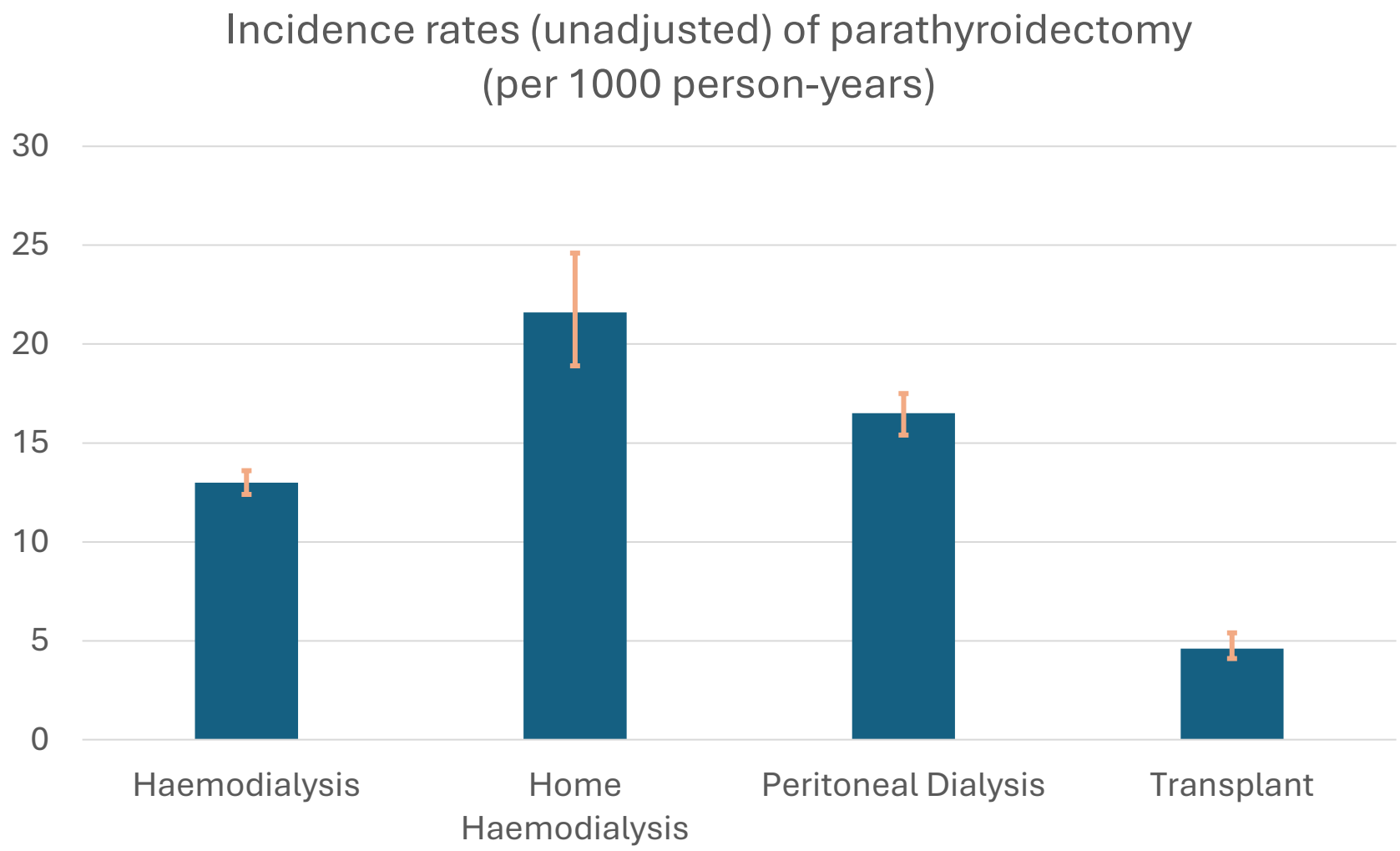
*Models adjusted for: Age, Gender, BMI, Dialysis vintage, Cause of kidney failure, dialysis modality, IHD & diabetes*

# Baseline Characteristics

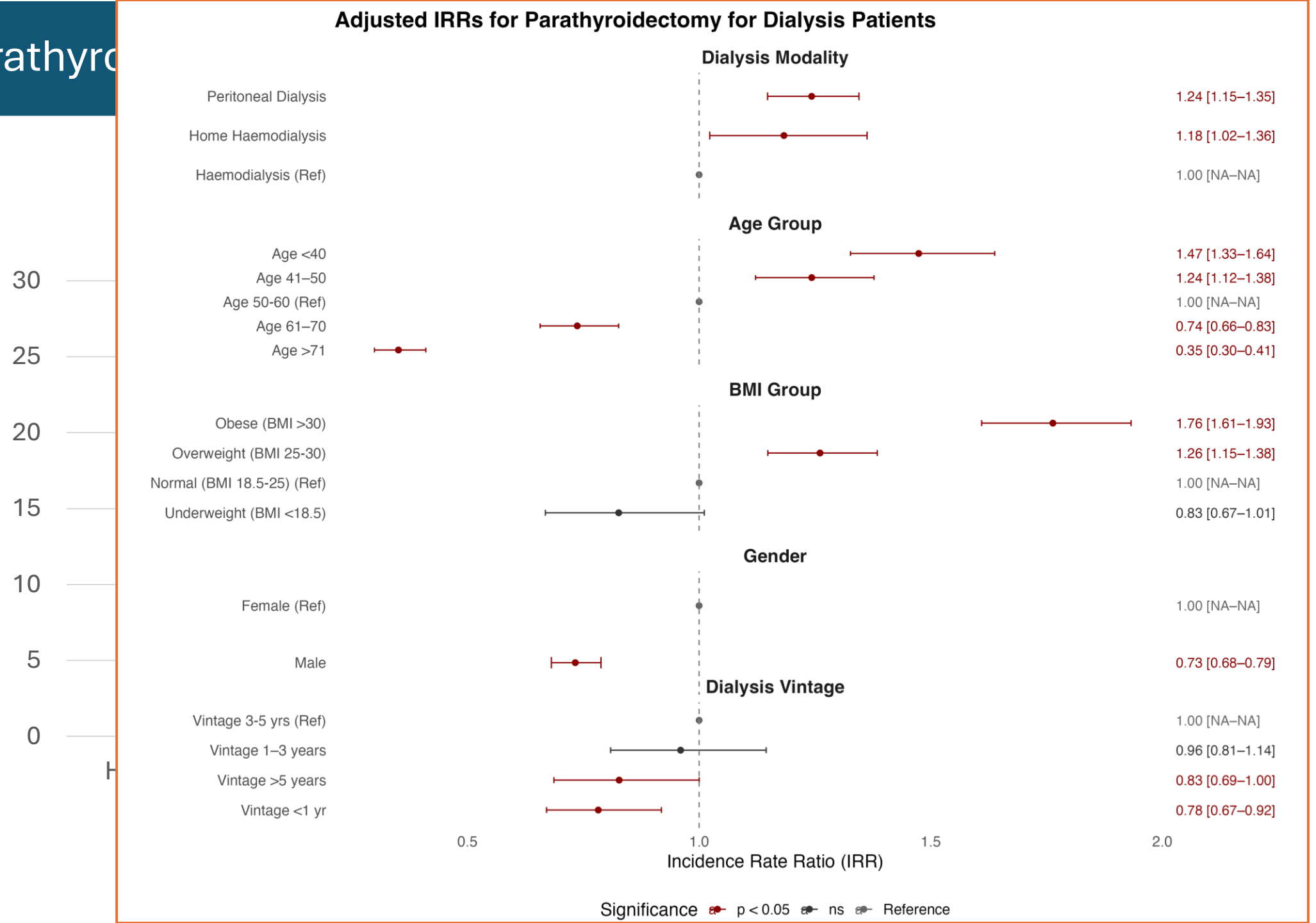
| Characteristics | Parathyroidectomy | |
|---|---|---|
| | All parathyroidectomy n=3538 | |
| | Total n= 1891 (53.4%) | |
| | Subtotal n= 1647 (46.6%) | |
| Age [Median(IQR)] (y) | 51.7 | (21.6) |
| BMI [Mean(SD)] (kg/m^2) | 28.9 | (7.4) |
| Gender | | |
| Male (n, %) | 1863 | (52.7) vs 60.5% |
| Female (n, %) | 1675 | (47.3) vs 39.5 % |
| KRT Modality | | |
| In-centre Haemodialysis (n, %) | 1733 | (49.0) |
| Home Haemodialysis (n, %) | 627 | (17.7) |
| Peritoneal Dialysis (n, %) | 830 | (23.5) |
| Transplant (n, %) | 348 | (9.8) |
| Dialysis Vintage (n, %) | | |
| <1 year | 256 | (7.2) |
| 1-3 years | 880 | (24.9) |
| 3-5 years | 985 | (27.8) |
| >5 years | 1417 | (40.1) |

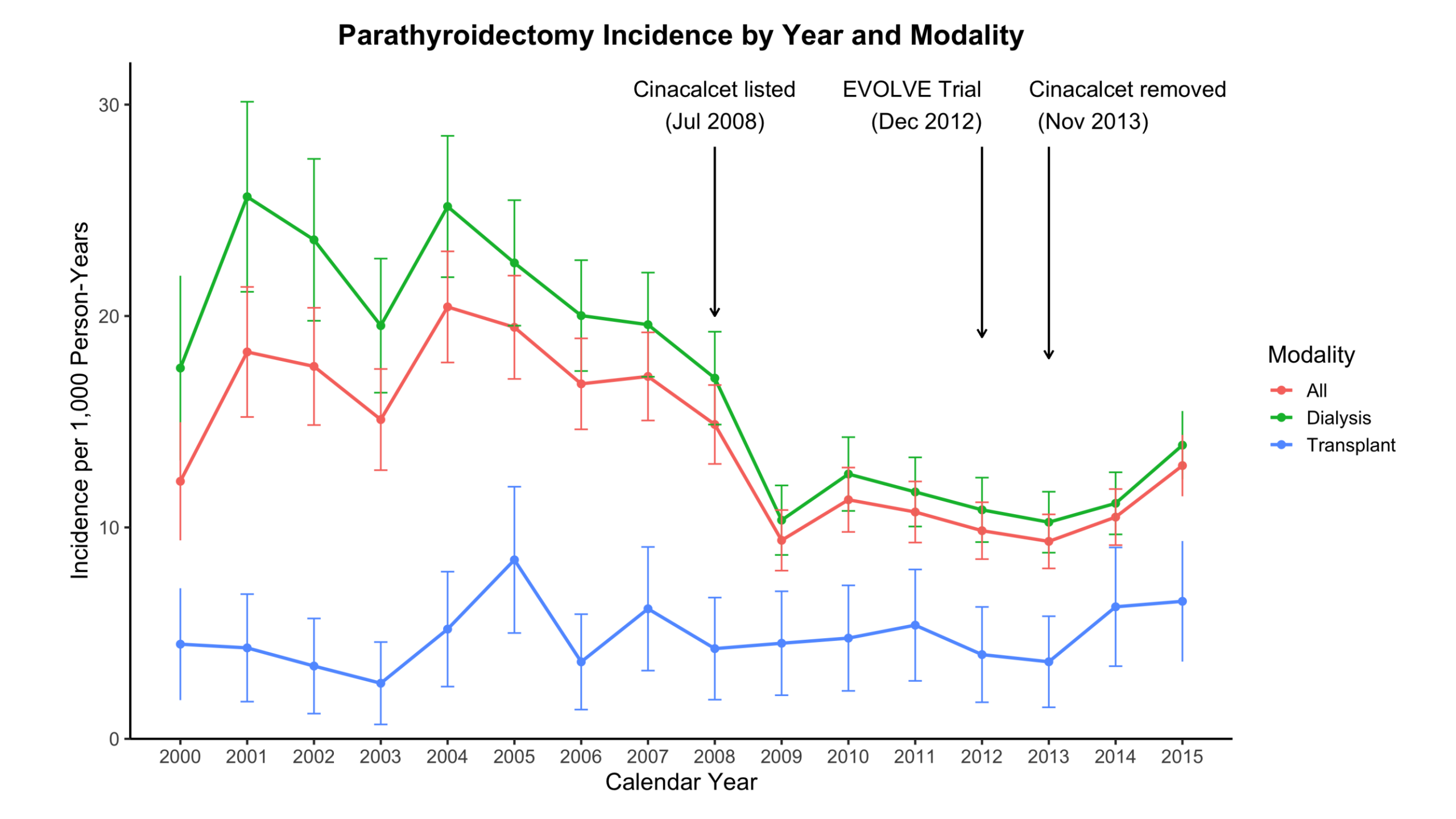
41.2 % vs 29.5%

# Rates of parathyroidectomy

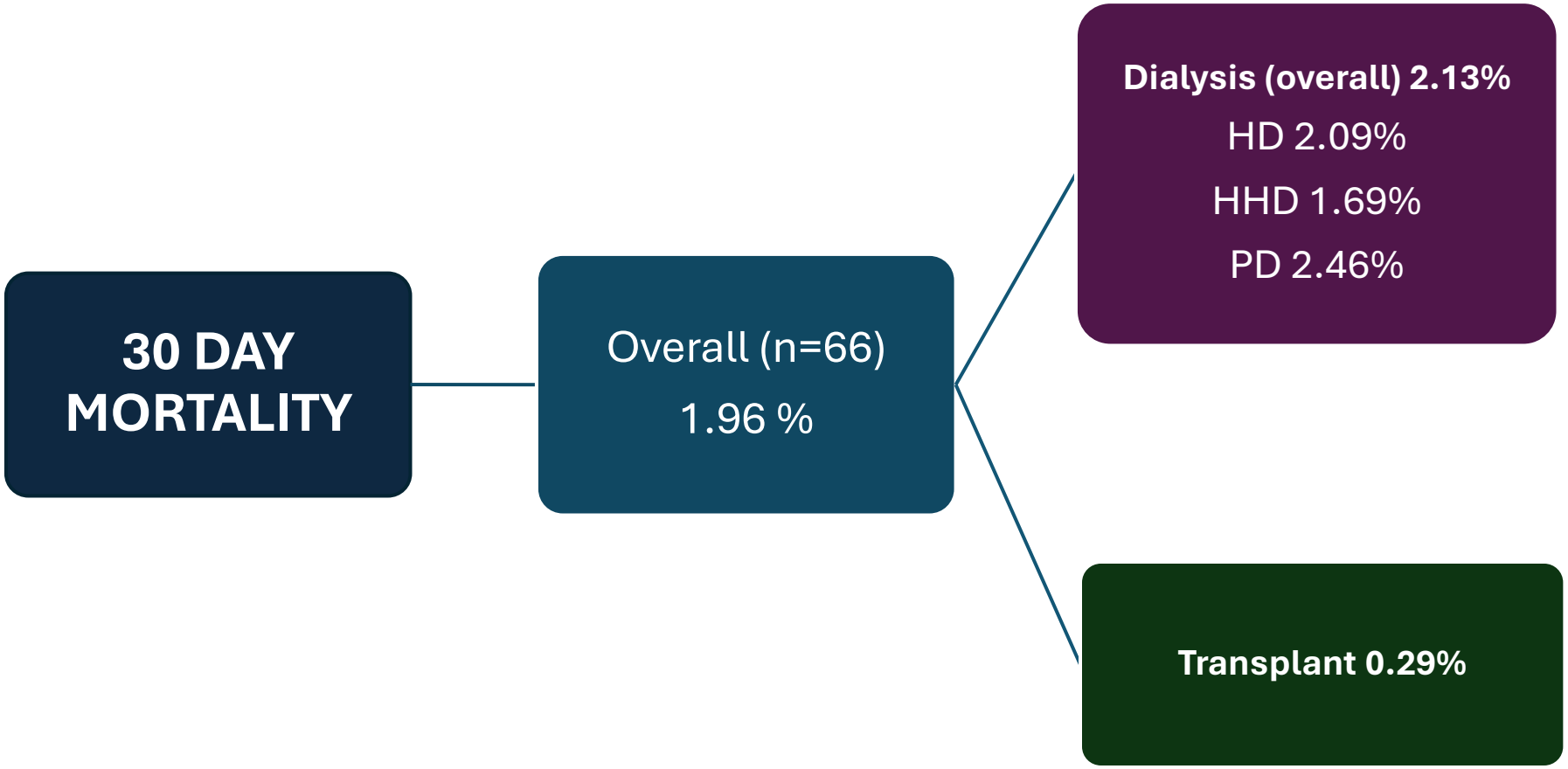


# Rates of parathyro

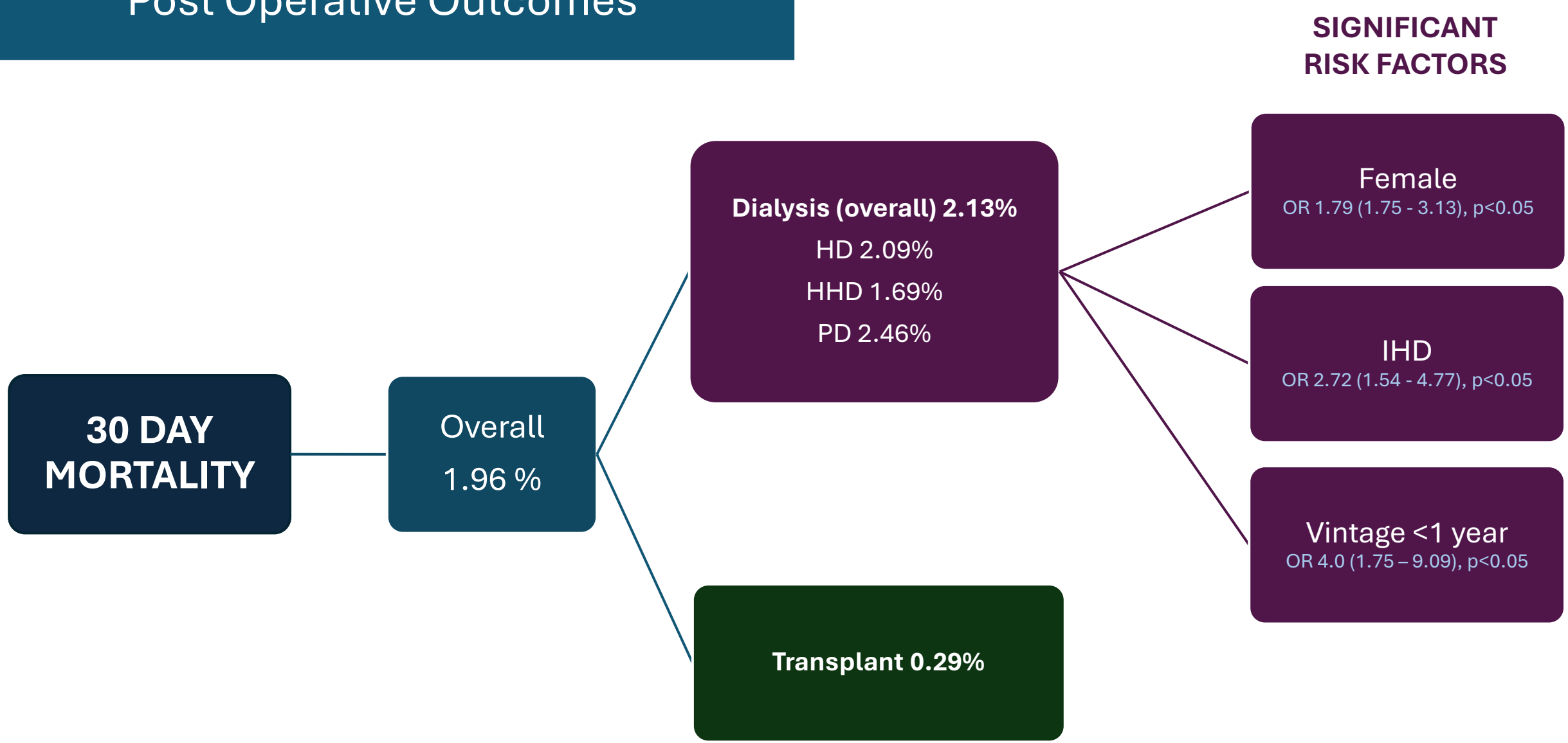



Parathyroidectomy Incidence by Year and Modality
Cinacalcet listed
(Jul 2008)
EVOLVE Trial
(Dec 2012)
Cinacalcet removed
(Nov 2013)
Incidence per 1,000 Person-Years
0
10
20
30
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Calendar Year
Modality
All
Dialysis
Transplant

# Post Operative Outcomes

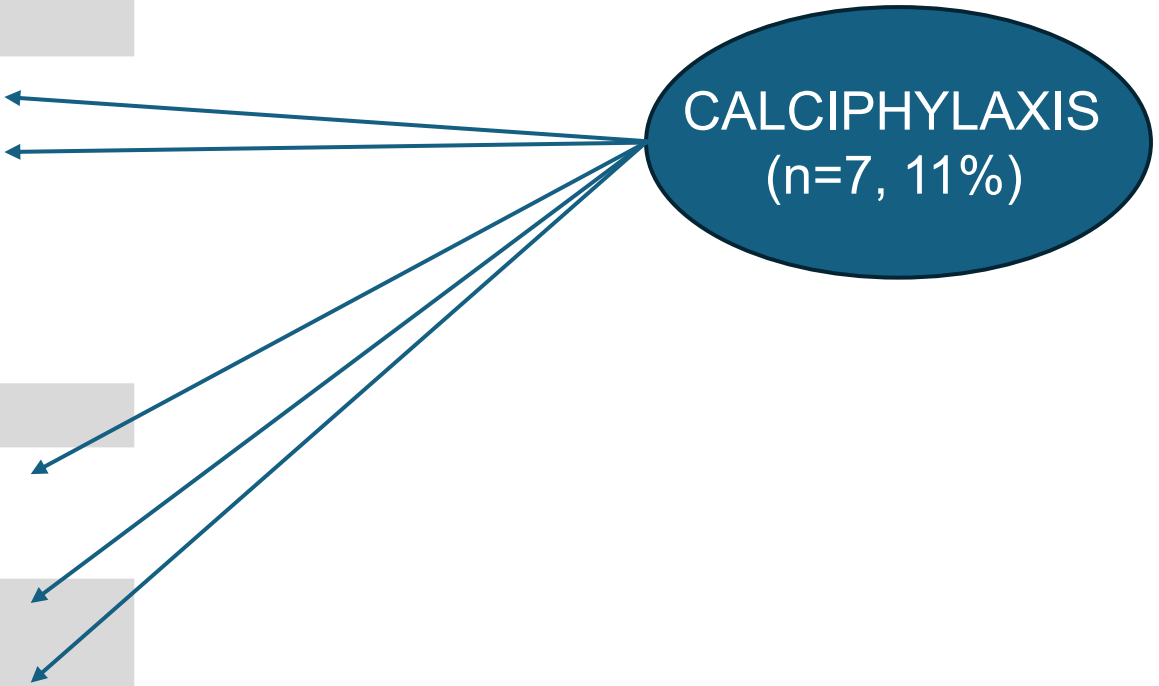


# Post Operative Outcomes

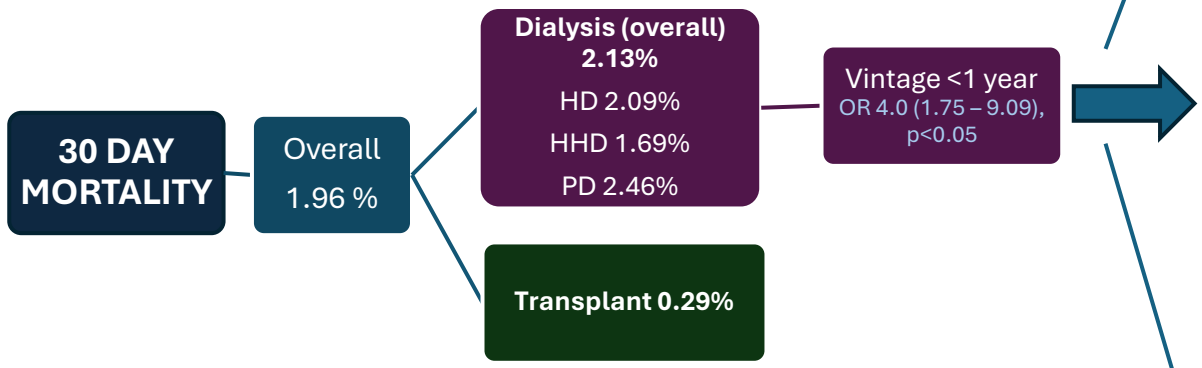


# Post Operative Outcomes

| 30-Day Mortality Cause | N=66 | |
|---|---|---|
| Cardiovascular | 34 | (52%) |
| Cardiac arrest | 12 | (18.2%) |
| Myocardial Ischaemia/Infarction | 21 | (31.9%) |
| Hypertensive Cardiac Failure | 1 | (1.52%) |
| Infection | 12 | (18.1%) |
| Sepsis | 4 | (6.06%) |
| Wound infection | 2 | (3.03%) |
| Respiratory infection | 2 | (3.03%) |
| Peritonitis | 2 | (3.03%) |
| Other site | 2 | (3.03%) |
| GI complication | 3 | (4.55%) |
| Bowel infarction | 2 | (3.03%) |
| Perforated abdominal viscous | 1 | (1.52%) |
| Dialysis withdrawal | 15 | (22.7%) |
| Other | 2 | (3.03%) |



# 30-day post op mortality risk factor: Vintage <1 year breakdown




**12 patients identified**

7 Subtotal parathyroidectomy

5 Total parathyroidectomy

Causes of mortality:

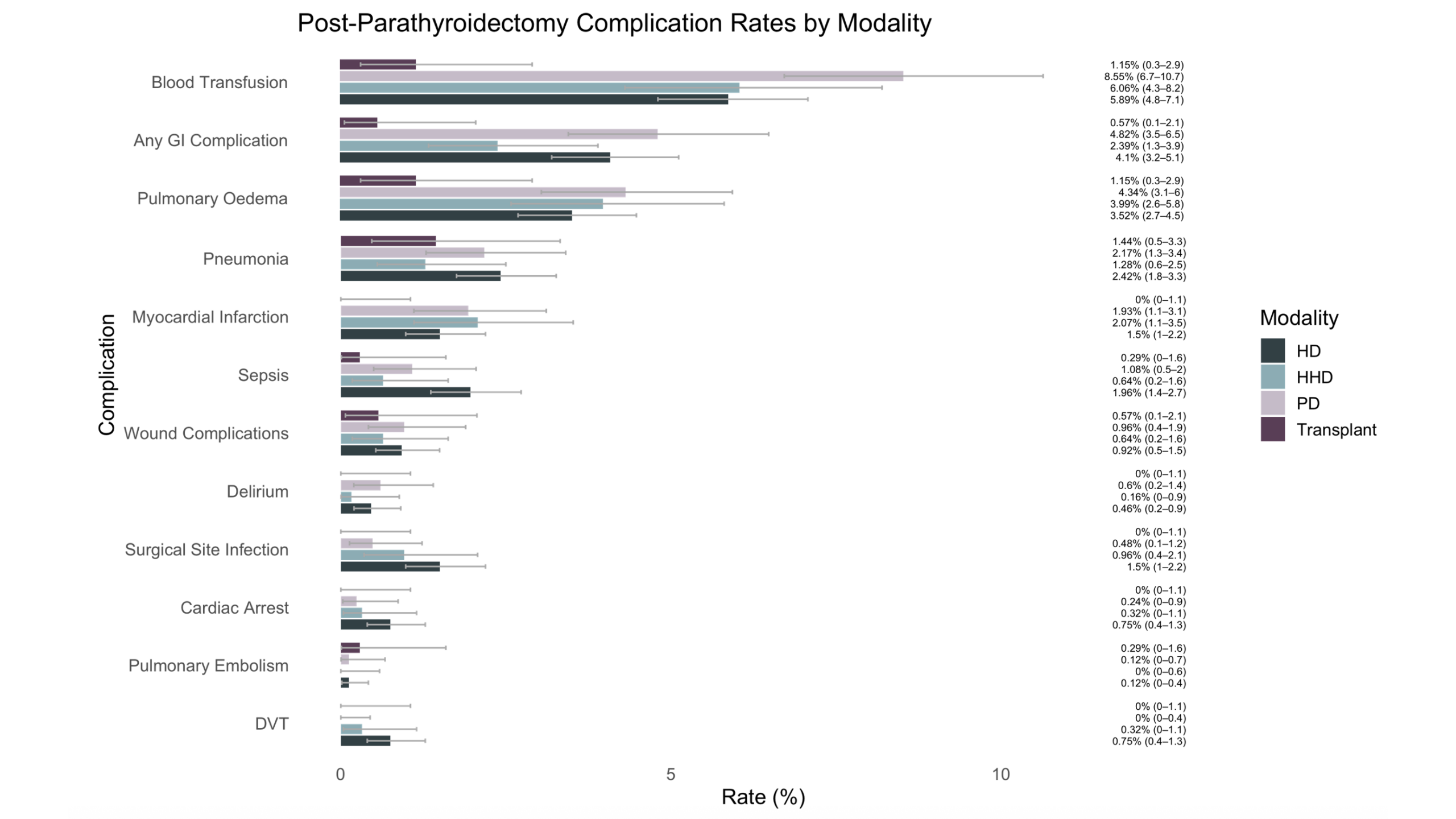
**5 Cardiac event**
(MI, arrest, HF)

**3 Calciphylaxis**
(complications of)

2 Pneumonia

2 Withdrawal of dialysis
(due to comorbidities and psychosocial)

| Characteristics | n | % |
|---|---|---|
| Age | | |
| < 40 years | 1 | 8.3% |
| 40-50 years | 2 | 16.7% |
| 50-60 years | 0 | 0% |
| 60-70 years | 6 | 50% |
| >70 years | 3 | 25% |
| Gender | | |
| Male | 6 | 50% |
| Female | 6 | 50% |
| BMI | | |
| Underweight | 2 | 16.7% |
| Normal | 3 | 25% |
| Overweight | 2 | 16.7% |
| Obese | 5 | 41.7% |
| Dialysis modality | | |
| HD | 5 | 41.7% |
| HHD | 0 | 0% |
| PD | 7 | 58.3% |
| Comorbidity | | |
| Ischaemic Heart Disease | 5 | 41.7% |
| Diabetes Mellitus | 5 | 41.7% |
| Hypertension | 7 | 58.3% |
| Kidney disease | | |
| Diabetic Kidney Disease | 5 | 41.7% |
| Renovascular/HTN | 2 | 16.7% |
| Glomerulonephritis | 2 | 16.7% |
| Other | 3 | 25% |


Post-Parathyroidectomy Complication Rates by Modality
Complication
Blood Transfusion
Any GI Complication
Pulmonary Oedema
Pneumonia
Myocardial Infarction
Sepsis
Wound Complications
Delirium
Surgical Site Infection
Cardiac Arrest
Pulmonary Embolism
DVT
1.15% (0.3–2.9)
8.55% (6.7–10.7)
6.06% (4.3–8.2)
5.89% (4.8–7.1)
0.57% (0.1–2.1)
4.82% (3.5–6.5)
2.39% (1.3–3.9)
4.1% (3.2–5.1)
1.15% (0.3–2.9)
4.34% (3.1–6)
3.99% (2.6–5.8)
3.52% (2.7–4.5)
1.44% (0.5–3.3)
2.17% (1.3–3.4)
1.28% (0.6–2.5)
2.42% (1.8–3.3)
0% (0–1.1)
1.93% (1.1–3.1)
2.07% (1.1–3.5)
1.5% (1–2.2)
0.29% (0–1.6)
1.08% (0.5–2)
0.64% (0.2–1.6)
1.96% (1.4–2.7)
0.57% (0.1–2.1)
0.96% (0.4–1.9)
0.64% (0.2–1.6)
0.92% (0.5–1.5)
0% (0–1.1)
0.6% (0.2–1.4)
0.16% (0–0.9)
0.46% (0.2–0.9)
0% (0–1.1)
0.48% (0.1–1.2)
0.96% (0.4–2.1)
1.5% (1–2.2)
0% (0–1.1)
0.24% (0–0.9)
0.32% (0–1.1)
0.75% (0.4–1.3)
0.29% (0–1.6)
0.12% (0–0.7)
0% (0–0.6)
0.12% (0–0.4)
0% (0–1.1)
0% (0–0.4)
0.32% (0–1.1)
0.75% (0.4–1.3)
0
5
10
Rate (%)
Modality
HD
HHD
PD
Transplant

# Limitations

- Parathyroidectomy specific complications not available e.g. Hungry bone syndrome, IV calcium infusion requirements
- No serum biomarkers (PO4, Ca, Vit D etc)
- Indication for parathyroidectomy, symptoms and calciphylaxis diagnosis unavailable
- Limited fracture data available
- Retrospective data – residual confounding factors

Parathyroidectomy in KRT is safe

Parathyroidectomy rates are significantly lower in transplant patients

Rates are higher in:

- Females
- Younger age
- BMI >25 (Overweight/obese)
- Home therapies (HHD, PD)
- Dialysis vintage between 1-5 years

PD patients have higher rates of complications

Changes in significantly policy impact clinical practice and trends

## Conclusion

- Parathyroidectomy specific post-op complications and long-term mortality & cardiovascular outcome
- Impact on overall fracture risk
- Influence/effect on transplant work-up

## Further studies

# Acknowledgements


## Supervisor

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## Collaborators

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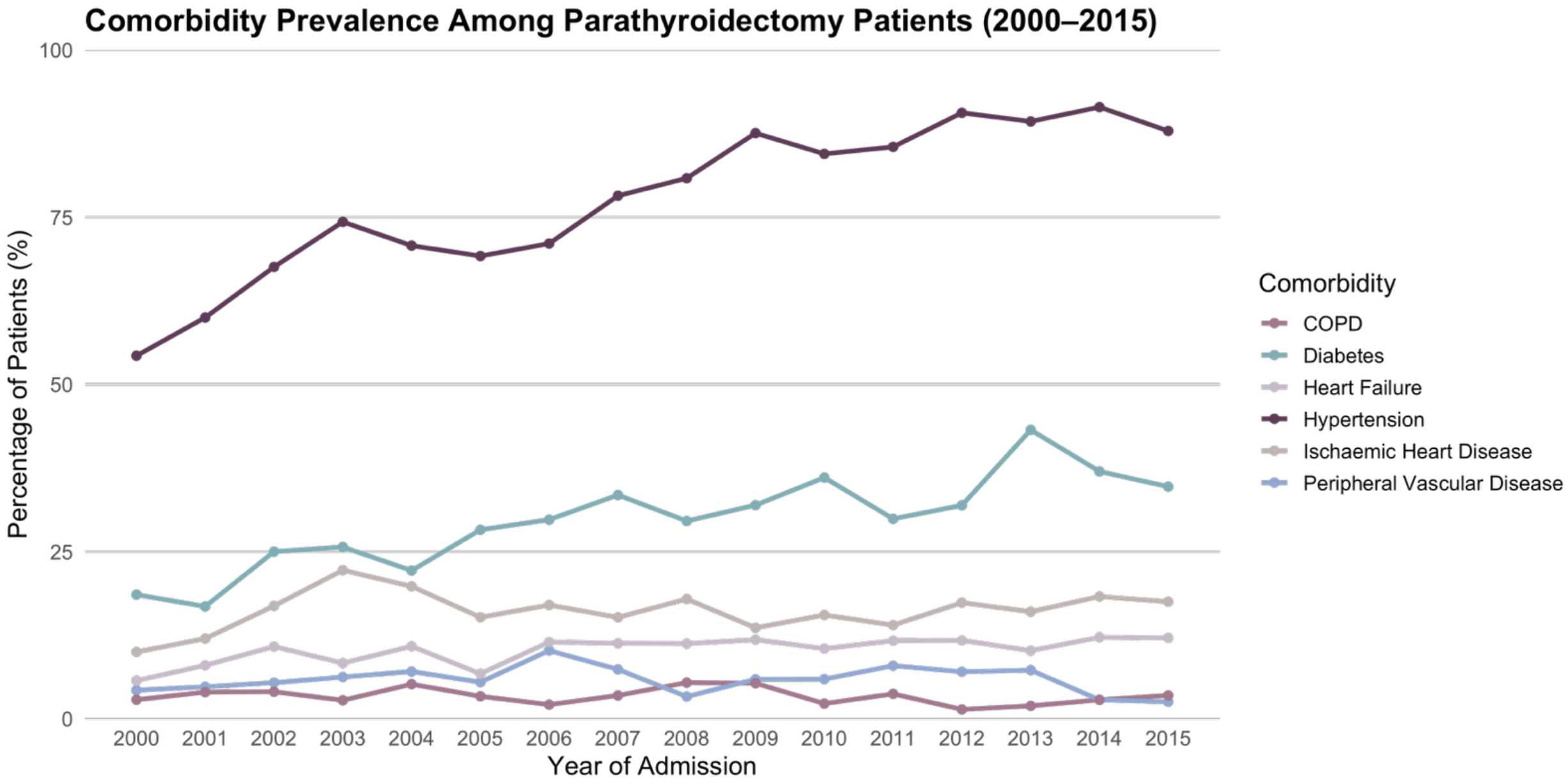
# **Supplementary:** Change in characteristics of parathyroidectomy cohort over time



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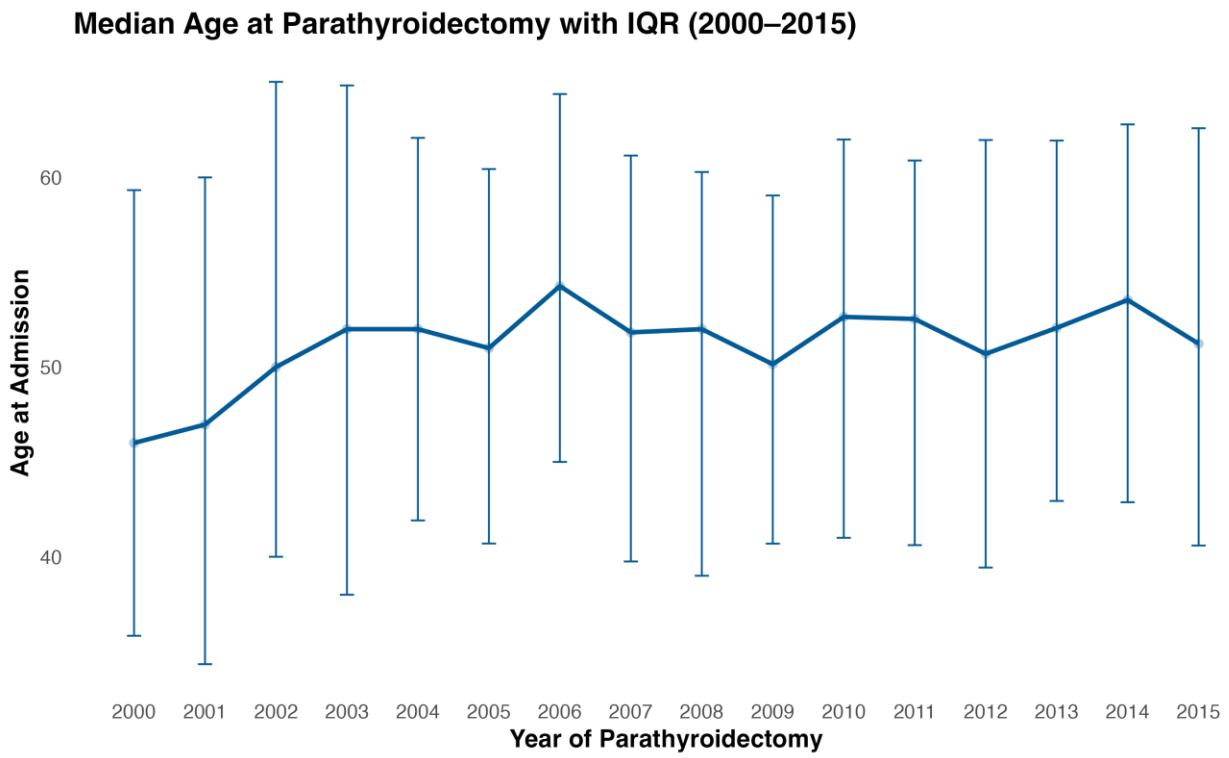
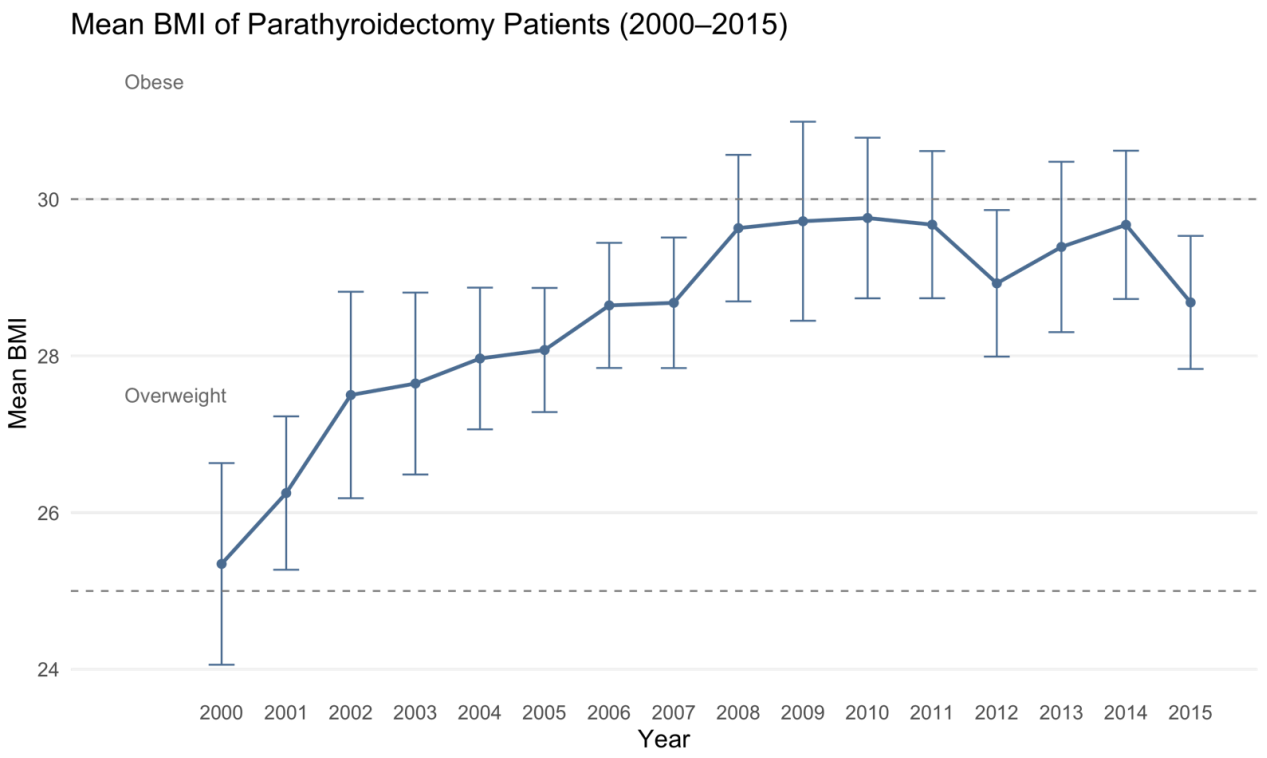
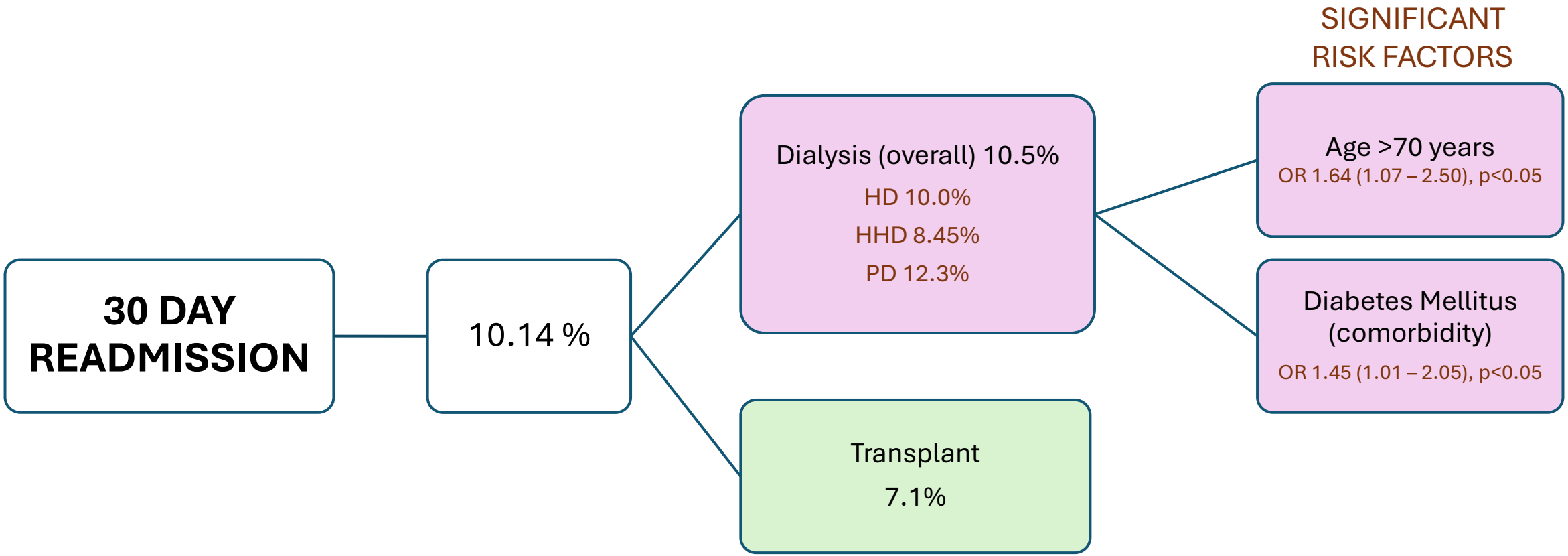
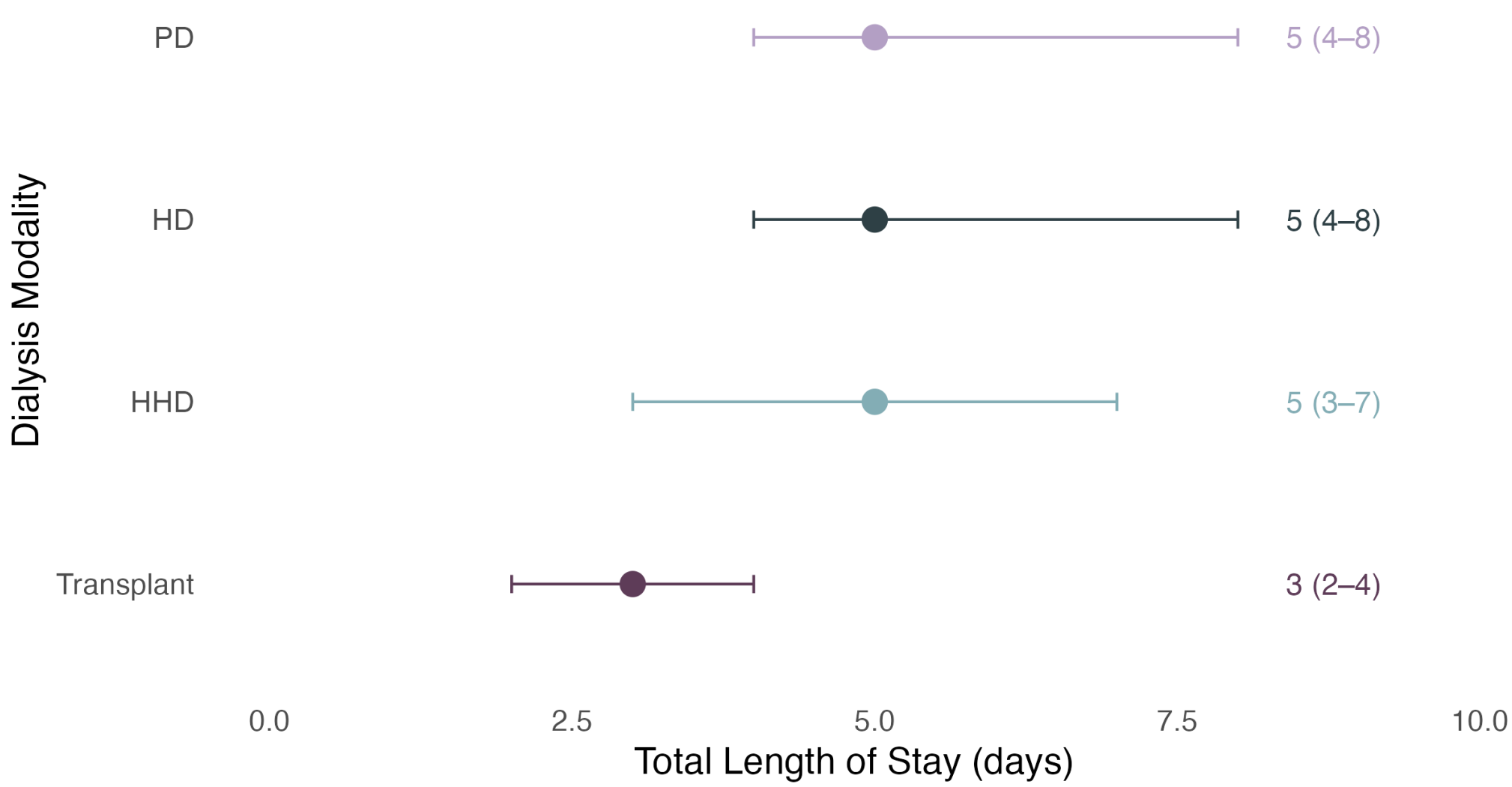


# **Supplementary:** 30 day readmissions



# **Supplementary:** Total Length of Stay (Median) for Parathyroidectomy Patients



## Supplementary:

## Rates of *first* hip and spine fractures requiring surgery in Dialysis

Parathyroidectomy patients (n=58) 1.76% of all parathyroidectomy patients

*(35 occurred after a parathyroidectomy)*

Non-parathyroidectomy patients (n=962) 2.53% of all non-para patients

**Supplementary:** Characteristics of dialysis patients who had a hip or spine fracture requiring surgery after a parathyroidectomy

| Characteristics | N=35 | |
|---|---|---|
| Age (median[IQR]) (years) | 65.6 | (52.6-70.8) |
| Gender | | |
| Male | 12 | (34.3%) |
| Female | 23 | (65.7%) |
| BMI (median [IQR]) | 27.8 | (24.7-33.4) |
| Dialysis modality | | |
| HD | 26 | (74.3%) |
| HHD | 4 | (11.4%) |
| PD | 5 | (14.3%) |
| Kidney Disease | | |
| Glomerulonephritis | 8 | (22.9%) |
| Diabetic | 8 | (22.9%) |
| Other | 8 | (22.9%) |
| ADPKD | 3 | (8.6%) |
| HTN | 4 | (11.4%) |
| Reflux | 4 | (11.4%) |
| Dialysis vintage | | |
| <1 year | 0 | (0%) |
| 1-3 years | 1 | (2.86%) |
| 3-5 years | 3 | (8.57%) |
| >5 years | 31 | (88.6%) |
| Comorbidity | | |
| Ischaemic Heart Disease | 13 | (37.1%) |
| Diabetes Mellitus | 16 | (45.8%) |