New SRTR Risk-Adjustment Models for Adult Kidney Transplant Outcomes

Jon J. Snyder, PhD
Nicholas Salkowski, PhD
David Zaun, MS
Hui Xiong, MS
Susan Leppke, MPH
Dorry Segev, MD, PhD
Lawrence Hunsicker, MD
Ajay Israni, MD, MS
Bertram L. Kasiske, MD, FACP

Scientific Registry of Transplant Recipients
Minneapolis Medical Research Foundation
Minneapolis, MN, USA

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SRTR
SCIENTIFIC REGISTRY OF TRANSPLANT RECIPIENTS

Disclosures

Jon J. Snyder, PhD
Senior Epidemiologist, Director of Operations
Scientific Registry of Transplant Recipients, Minneapolis Medical Research Foundation, Minneapolis, MN, USA

I have no financial relationships to disclose within the past 12 months relevant to my presentation.

My presentation does not include discussion of off-label or investigational use.

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Background

- The Scientific Registry of Transplant Recipients (SRTR) is charged with evaluating transplant program performance in the United States.
- The program-specific reports (PSRs) include risk-adjusted assessments of graft and patient survival at each transplant program.
- SRTR currently maintains 43 risk-adjustment models for assessing posttransplant outcomes.
- Following a recommendation from the 2012 Consensus Conference on Transplant Program Quality & Surveillance, the SRTR has developed a standardized process for developing and maintaining the risk adjustment models.
- The kidney models were the first to be rebuilt following the new process.

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Meeting Report

Report of a Consensus Conference on Transplant Program Quality and Surveillance

B. L. Kasiske[a,b,*], M. A. McBride[c], D. L. Cornell[d], R. S. Gaston[e], M. L. Henry[f], F. D. Irwin[g], A. K. Israni[a,b,h], N. W. Metzler[i], K. W. Murphy[j], A. I. Reed[k], J. P. Roberts[l], N. Salkowski[b], J. J. Snyder[b,h] and S. C. Sweet[m]

sess outcomes at small-volume transplant programs should be developed. More data on waiting list risk and outcomes should be provided. Monitoring and reporting of short-term living donor outcomes should be enhanced. Overall, there was broad consensus that substantial improvement in reporting outcomes of transplant programs in the United States could and

- Recommendation I.2: Rather than each model being refit every 6 months, the time between revisions should be increased and used to more carefully review the models and data elements.
  - SRTR makes minor changes in the PSR models every 6 months. Instead, models should be more extensively reexamined every 3 to 5 years, with appropriate input from the transplant community and the SRTR Technical Advisory Committee (STAC).

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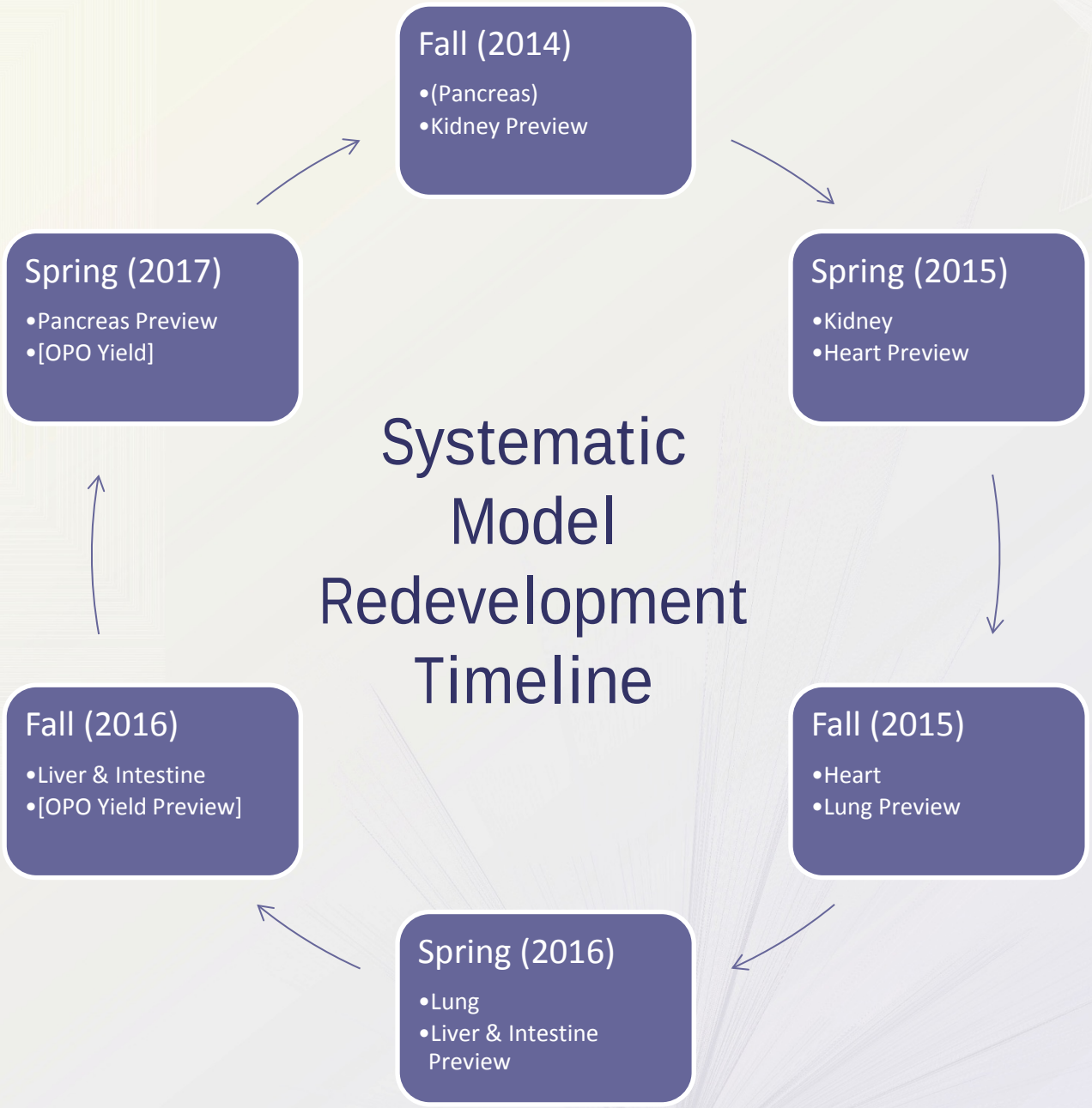
Systematic Model Redevelopment Timeline



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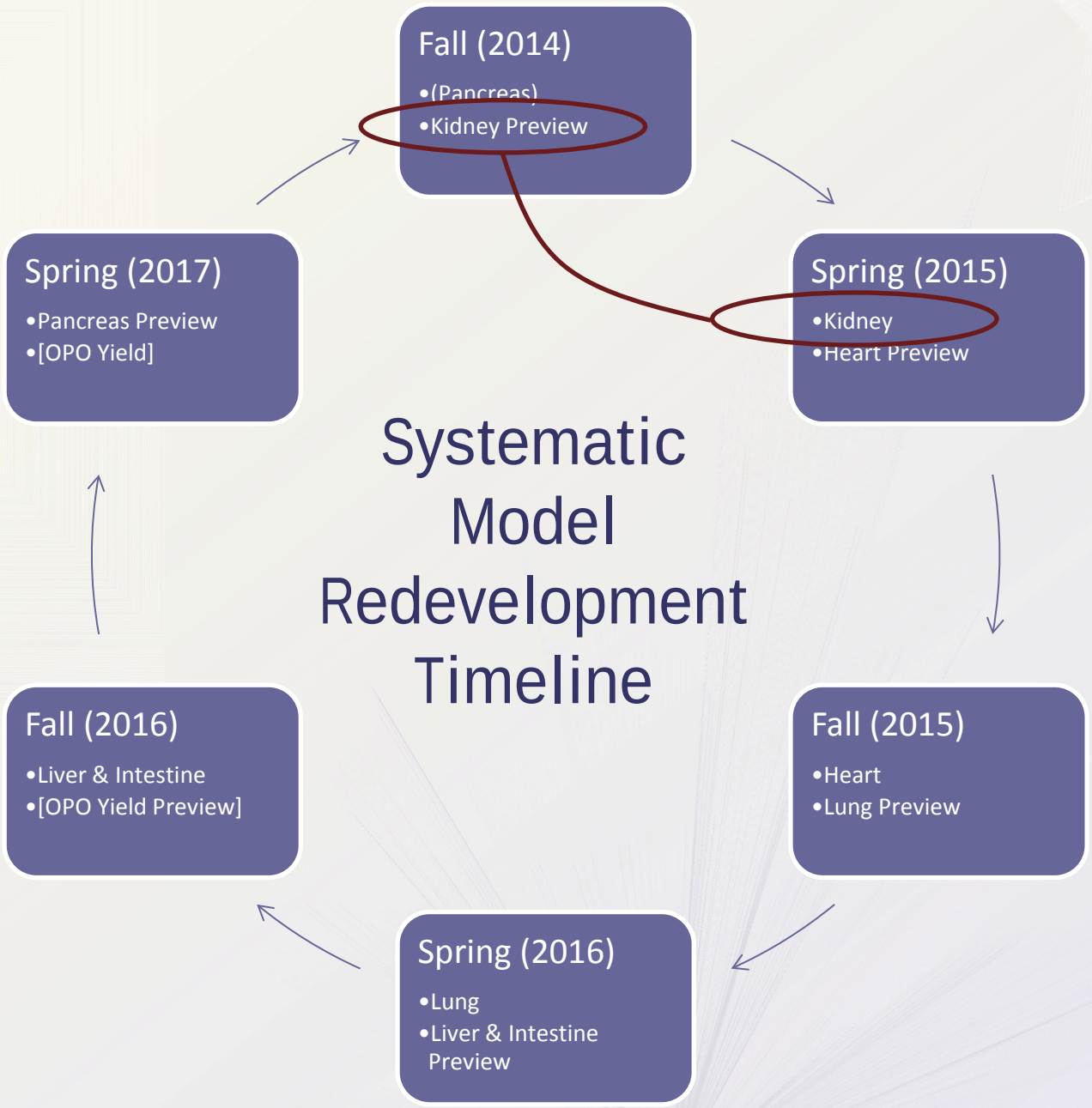
Systematic Model Redevelopment Timeline



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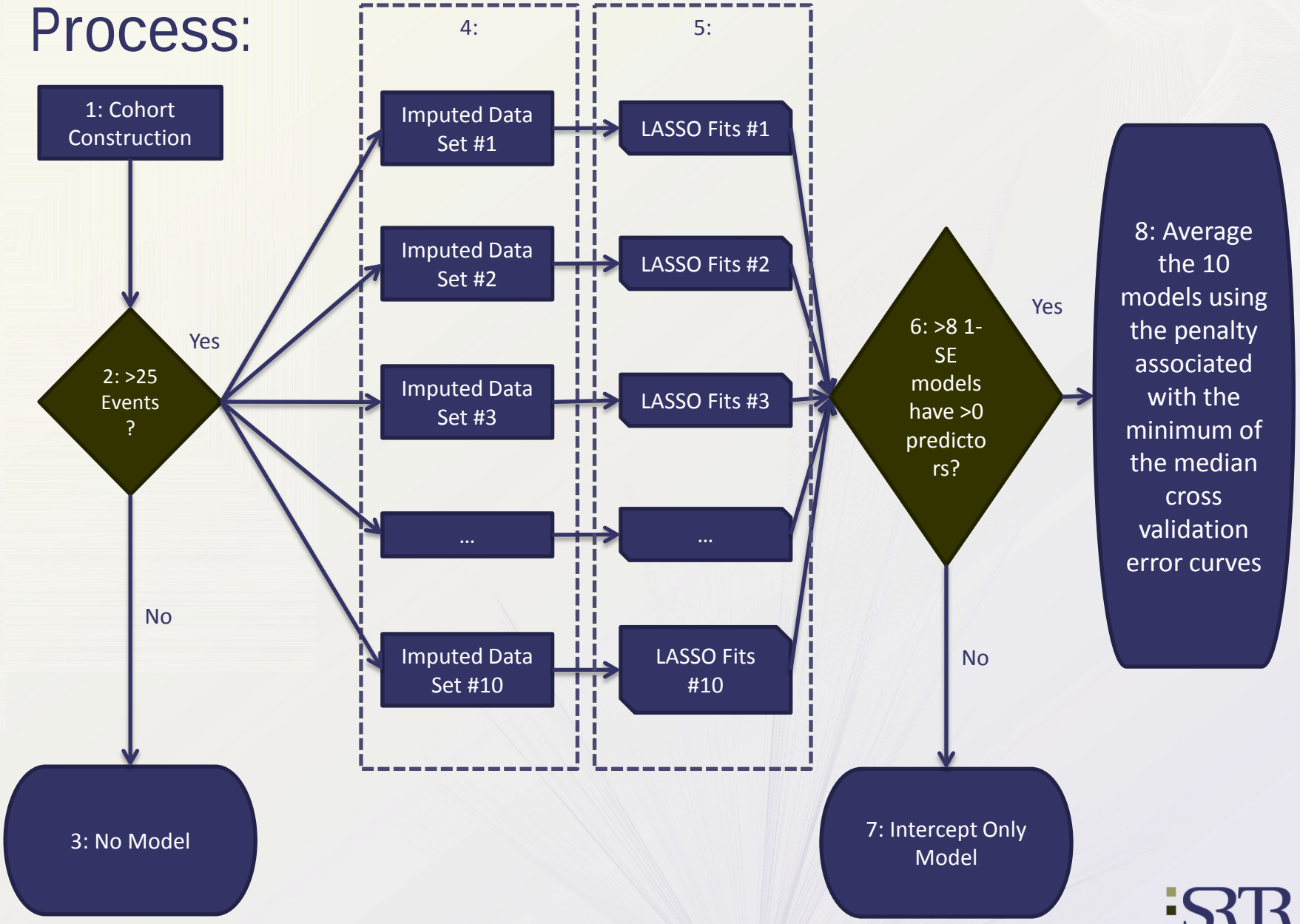
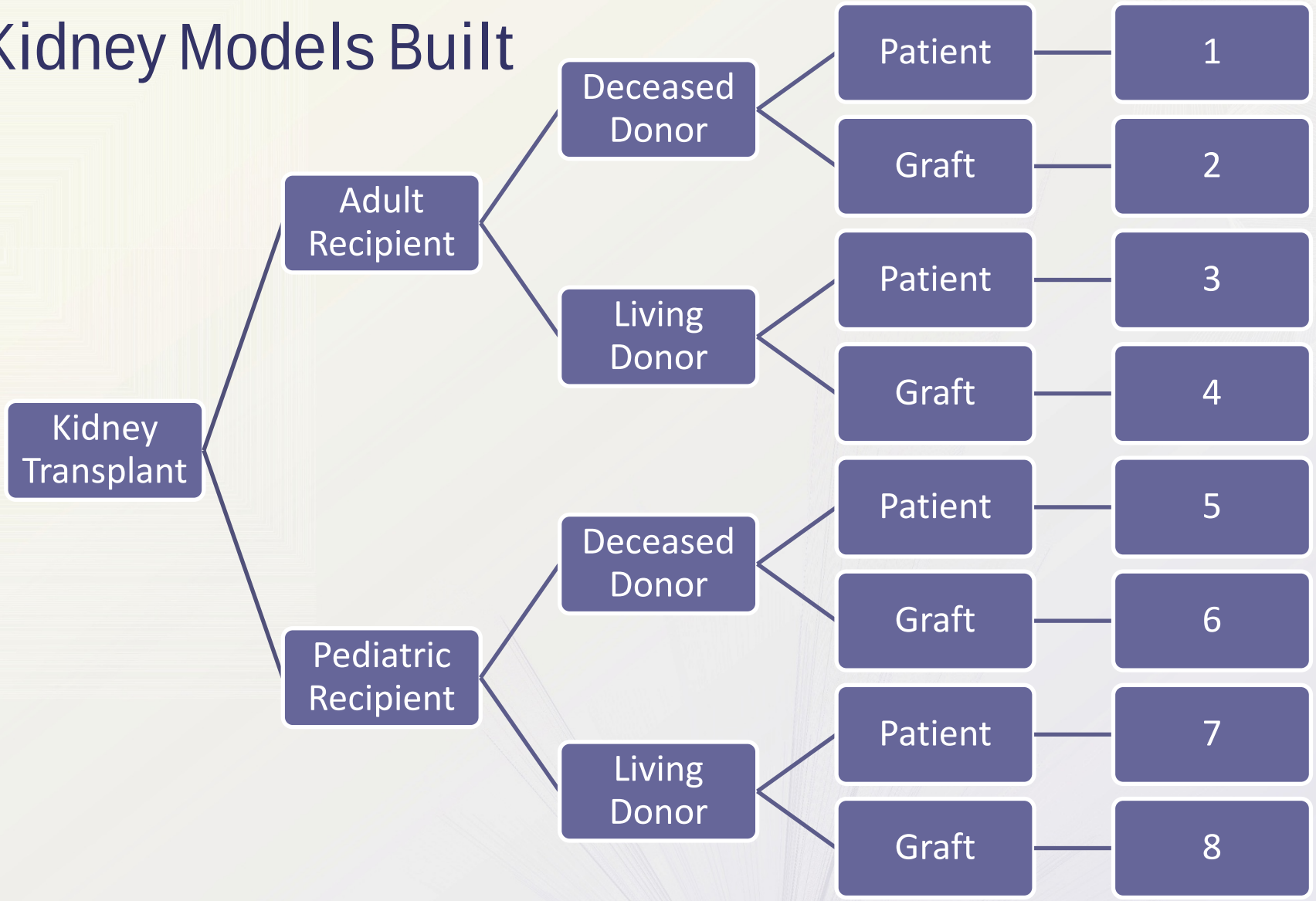
Process:


4:
5:
1: Cohort Construction
2: >25 Events ?
Yes
No
3: No Model
Imputed Data Set #1
Imputed Data Set #2
Imputed Data Set #3
...
Imputed Data Set #10
LASSO Fits #1
LASSO Fits #2
LASSO Fits #3
...
LASSO Fits #10
6: >8 1-SE models have >0 predictors?
Yes
No
7: Intercept Only Model
8: Average the 10 models using the penalty associated with the minimum of the median cross validation error curves

Kidney Models Built



Upcoming Changes to Program-Specific Reports:

Spring 2015

New Risk-Adjustment Models for Kidney Programs

SRTR has implemented a rolling cycle to redevelop risk-adjustment models used to estimate expected outcomes for all organ types. The first posttransplant risk-adjustment models were redeveloped for kidney programs. These new models were previewed during the fall 2014 PSR cycle. During this preview, programs were provided with documentation of the new models on their secure SRTR websites so they could begin to review their data for completeness and accuracy in preparation for the spring 2015 PSR cycle. These documents can also be viewed from the link below.

Note that these new models were **not** used during the fall 2014 PSR cycle. SRTR is providing documentation of the new models so programs have 6 months to prepare and review their data. The new models are scheduled to be implemented for the spring 2015 PSR cycle.

Finally, note that the change to a Bayesian statistical methodology is separate from the change to new risk-adjustment models used to determine expected outcomes. The change to Bayesian methodology occurred during the fall 2014 PSR cycle. The new kidney models will go into effect for the spring 2015 PSR cycle. New risk-adjustment models for heart programs are currently in development with a preview scheduled for spring 2015 and implementation scheduled for the fall 2015 PSR cycle.

Updated risk adjustment models for post-transplant kidney outcomes (1-year and 3-year patient and graft survival) are coming for the Spring 2015 PSR cycle. Follow the links above for previews of the new risk adjustment models.

PSR Quick Links

- Transplant Program Reports
- Methodology
- Risk-Adjustment Models (Transplant Programs)
- Risk-Adjustment Models (OPO)
- Transplant Report Timeline
- OPO Report Timeline
- Past Notices
- FAQs

Contact the SRTR

914 South 8th Street
Suite S-4.100
Minneapolis, MN 55404

PSR Model Report

Kidney First-Year Risk Adjustment Models

Prepared By
Nicholas Salkowski, PhD
Jon Snyder, PhD
David Zaun, MS
Hui Xiong, MS

Timeline
Date September 22, 2014

New Kidney Graft Failure Model Contains:

Donor

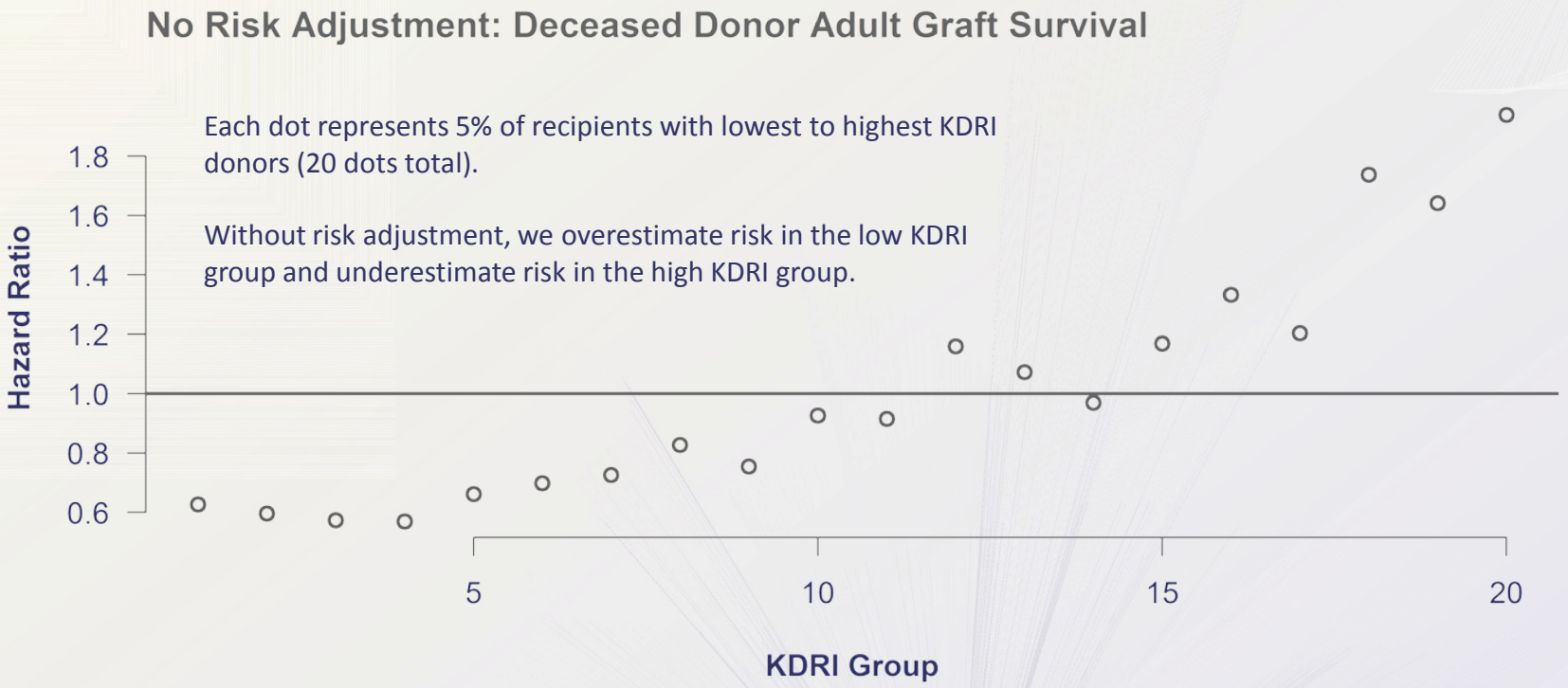
- Local vs. Shipped
- **Age***
- ABO Group
- **BMI***
- BUN
- Clinical Infection of the Lung
- **DCD***
- **Terminal eGFR***
- **Ethnicity***
- Anti-HBc
- Hx of Cancer
- **Drug-Treated Systemic HTN***
- Arginine Vasopressin
- Diuretics
- T4
- **KDRI (KDPI)***
- **Terminal Serum Creatinine***
- Cigarette Use
- HLA A Mismatches
- HLA DR Mismatches
- Cold Ischemia Time

***Components of the KDRI definition.**
Components new to the models are underlined.

Recipient

- Hx of Drug-treated COPD
- Ethnicity
- Hx of Malignancy
- Hx of Sympomatic PVD
- Total Serum Albumin at Listing
- Age
- BMI
- HIV Serostatus
- CPRA
- Pretransplant transfusions
- Primary Diagnosis
- Insurance
- Total ESRD Time
- Procedure Type

How good is the model at adjusting for donor risk?



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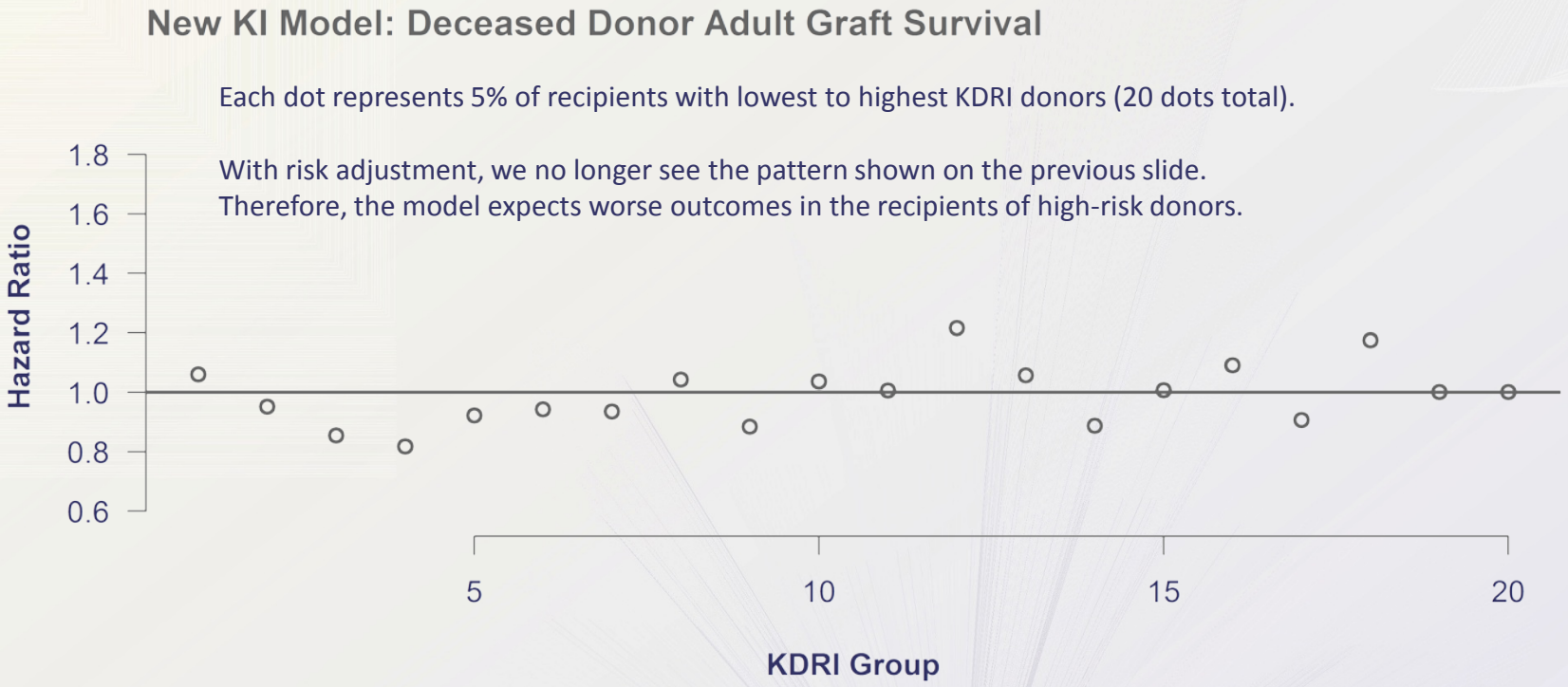
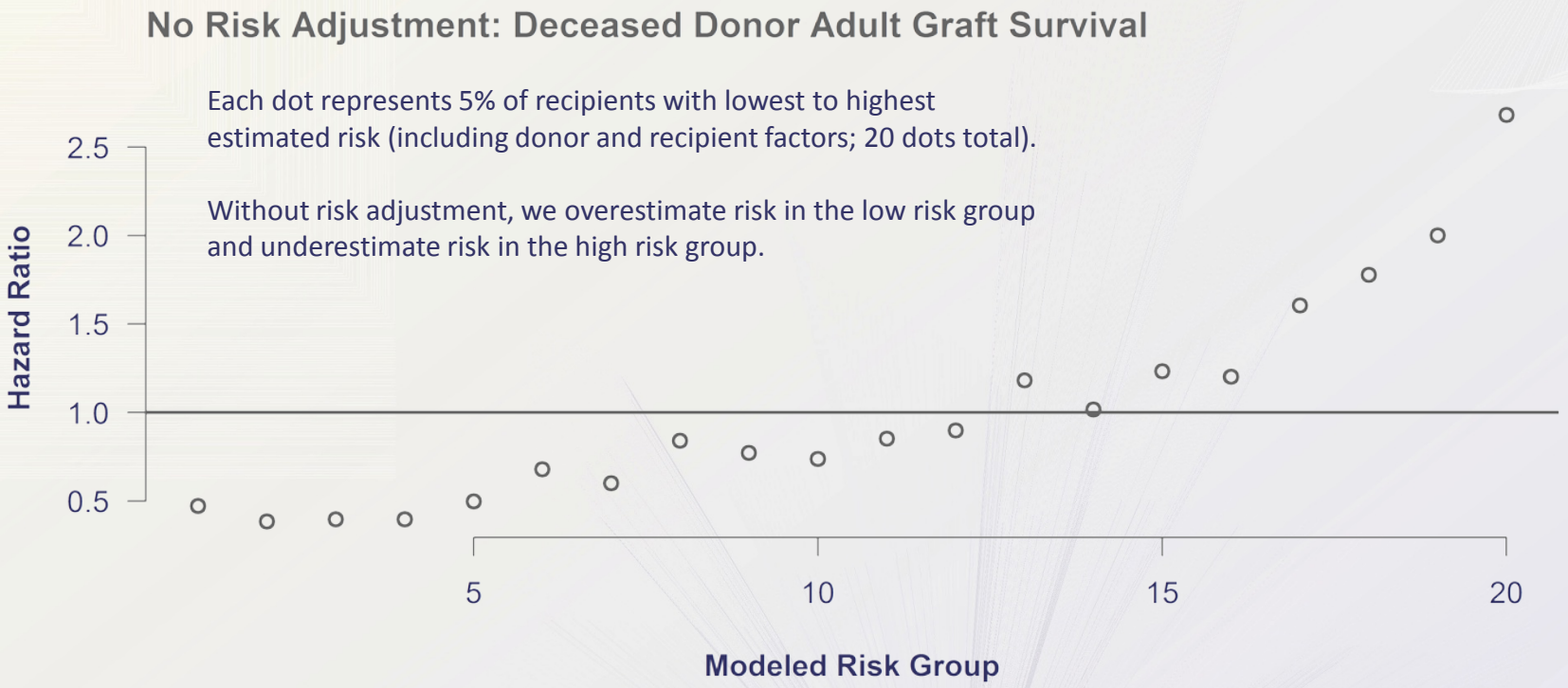


How good is the model at adjusting for combined recipient-donor (i.e., transplant) risk?



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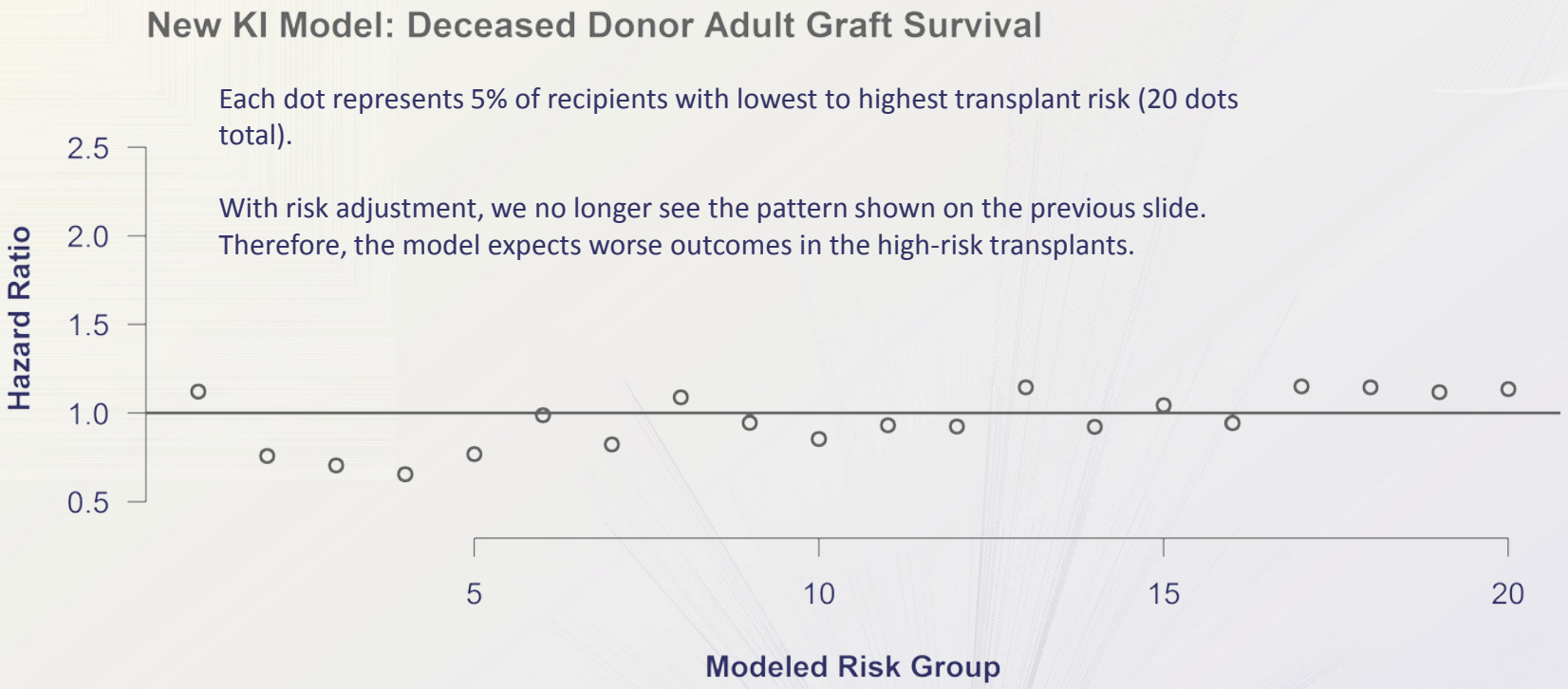

Model Performance: Discriminatory ability at the patient and program level.

Kidney Model	C-statistic	Program Concordance, similar volume (+/- 10%)
Adult, DD, GS	0.66	0.88
Adult, DD, PS	0.71	0.83
Adult, LD, GS	0.67	0.84
Adult, LD, PS	0.76	0.82

Upcoming Kidney Models: Spring 2015

Age	Donor Type	Outcome	Model?
Adult	Deceased	Graft	Yes
Adult	Living	Graft	Yes
Adult	Deceased	Patient	Yes
Adult	Living	Patient	Yes
Pediatric	Deceased	Graft	Intercept Only*
Pediatric	Living	Graft	No**
Pediatric	Deceased	Patient	No**
Pediatric	Living	Patient	No**

*No risk predictors identified that substantially improved our ability to estimate risk. Will use national event rate to determine expected outcomes.

**Fewer than 25 events occurred nationally. Not enough information to determine risk predictors.

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