SRTR Analyses of Outcomes After Waitlisting for HCC Patients Under MELD-based Allocation

OPTN/UNOS Symposium on Liver Allocation Policy for HCC

January 26, 2003

Miami, Florida

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30-Day and 90-Day Outcomes by MELD / PELD

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Methods (1)

- Sample: 22,091 liver-only candidates on the waitlist on between 2/27/02 and 8/10/02
- 30-day and 90-day outcomes reported for patients with:
  - No exceptions (adult/pediatric)
  - Hepatocellular carcinoma (HCC)

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Methods (2)

- Patients granted an HCC exception within 30 days of 2/27/02 or date of listing had exception score used for calculation of match MELD/PELD
- Follow-up time began on:
  - 2/27/02 for non-exception patients listed on or before 2/27/02
  - Listing date for non-exception patients listed between 2/28/02 and 8/10/02
  - Date of exception for patients granted exception scores
  - Lab date for patients with first MELD/PELD after listing but within 30 days

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Methods (3)

- 30-day and 90-day rates were derived from separate unadjusted Cox regression models of time to transplant or death, censored at the earlier of waitlist removal or 30-days or 90-days
- Percentage of transplants with expanded criteria for liver donors (ECD) was also calculated for each group. (ECD is defined by combinations of donor age, stroke, cardiac arrest, sodium>170 or partial/split liver that were associated with graft failure RR>1.7)

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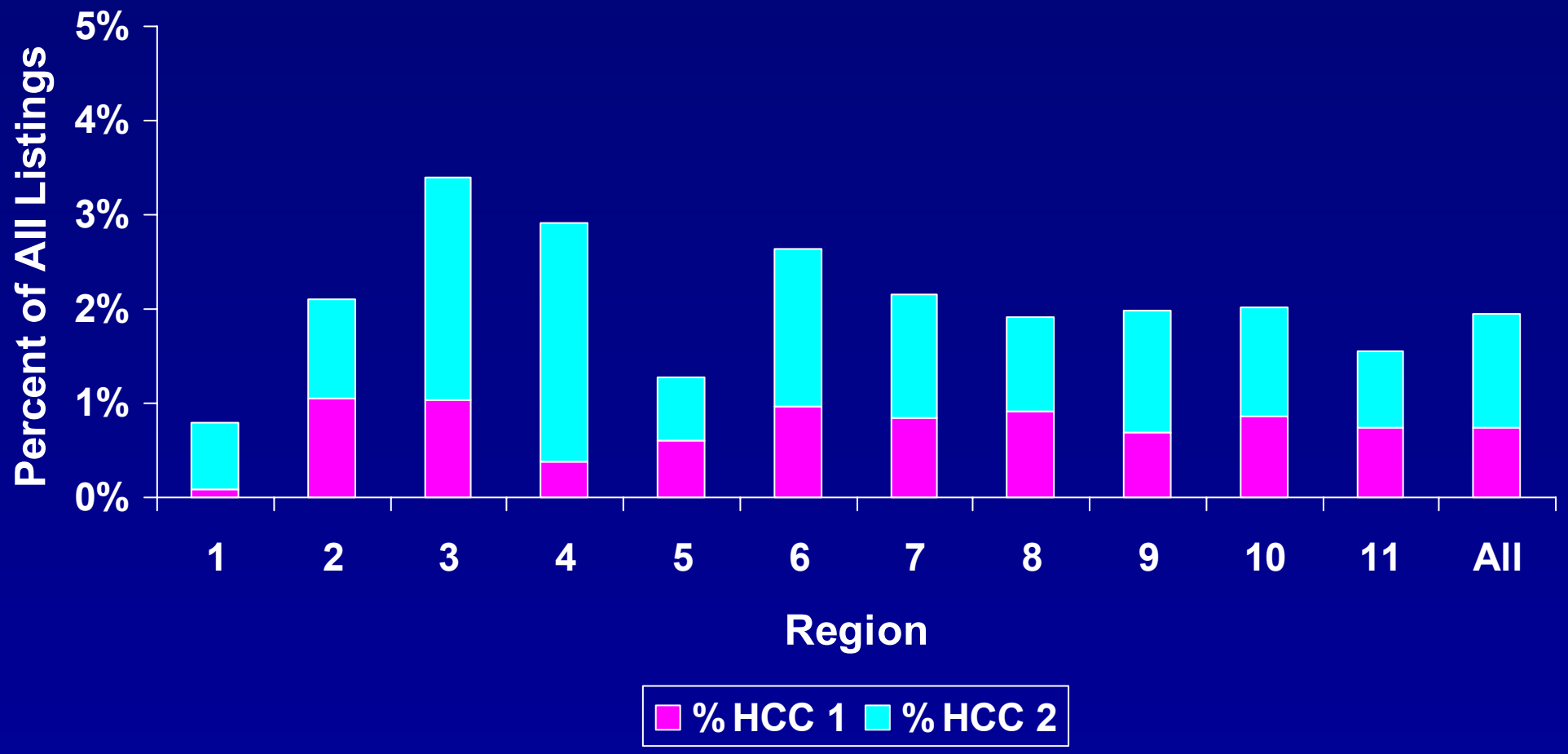
Proportion of Waitlist Candidates with an HCC Exception by Region



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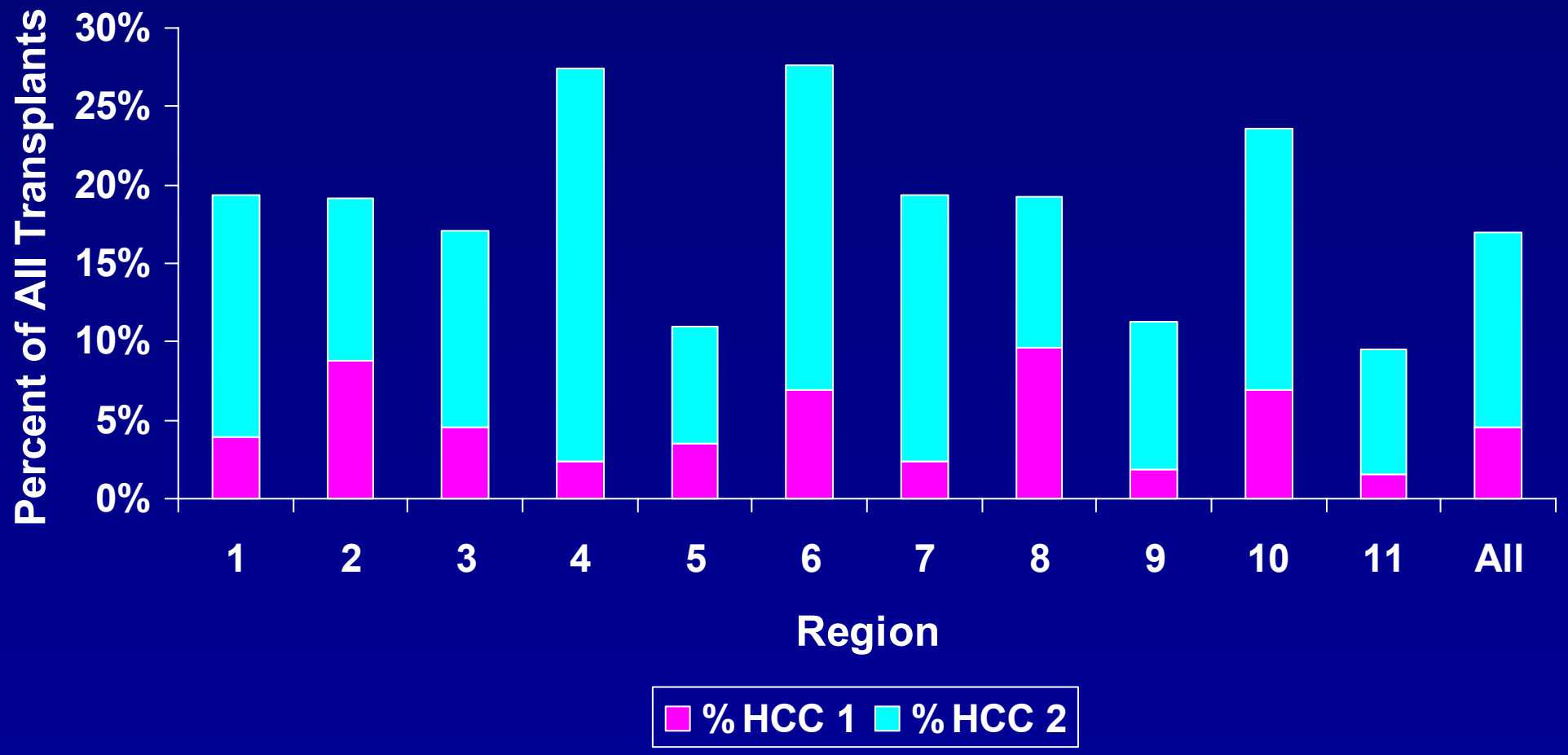
Proportion of Cadaveric Transplants with an HCC Exception by Region



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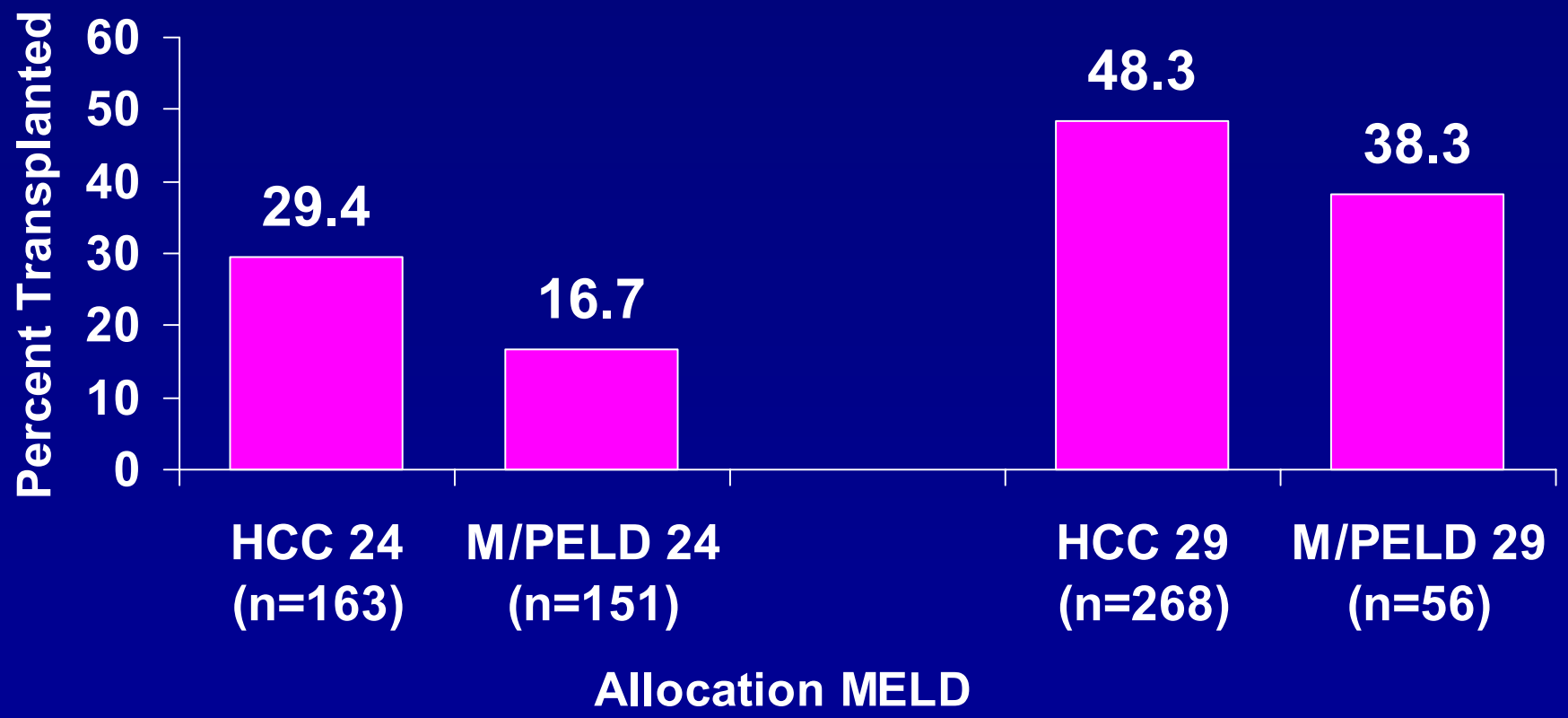
30-Day Transplant Rate* by HCC Exception Status



*From an unadjusted Cox model of time to transplant, censored at removal from the waitlist for reasons other than cadaveric transplant (including death).

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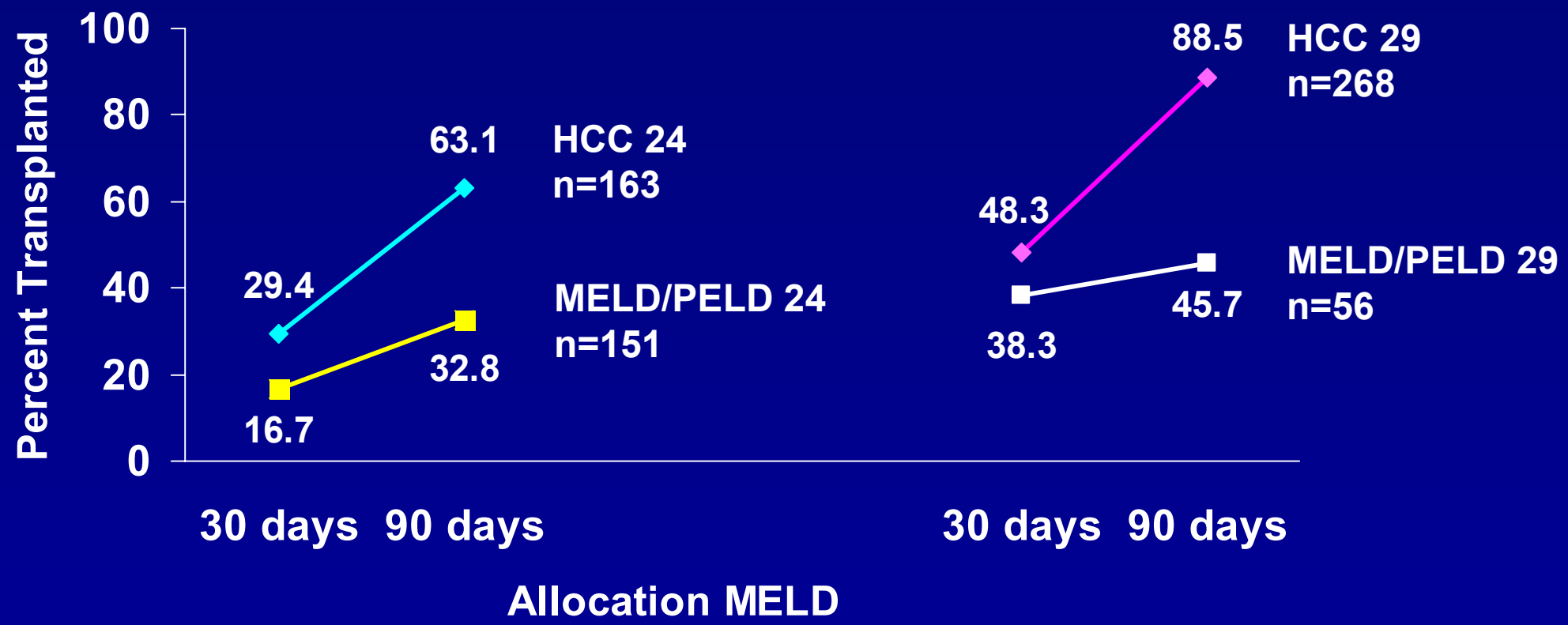
30-Day and 90-Day Transplant Rates* by HCC Exception Status



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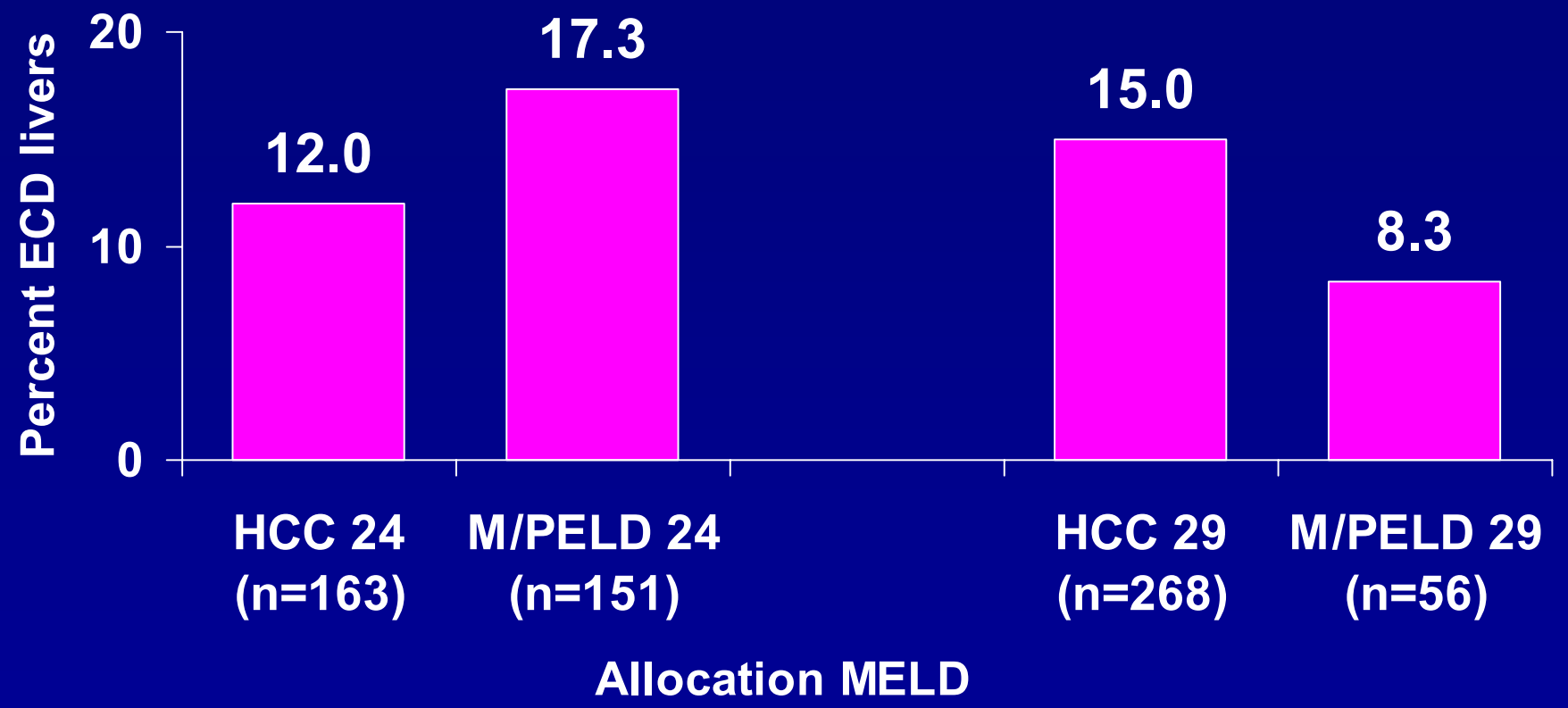
% ECD* Transplants Within 90 Days by HCC Exception Status



*Expanded criteria for liver donors (associated with RR>1.7) include donor age, stroke, cardiac arrest, sodium>170 or partial/split liver

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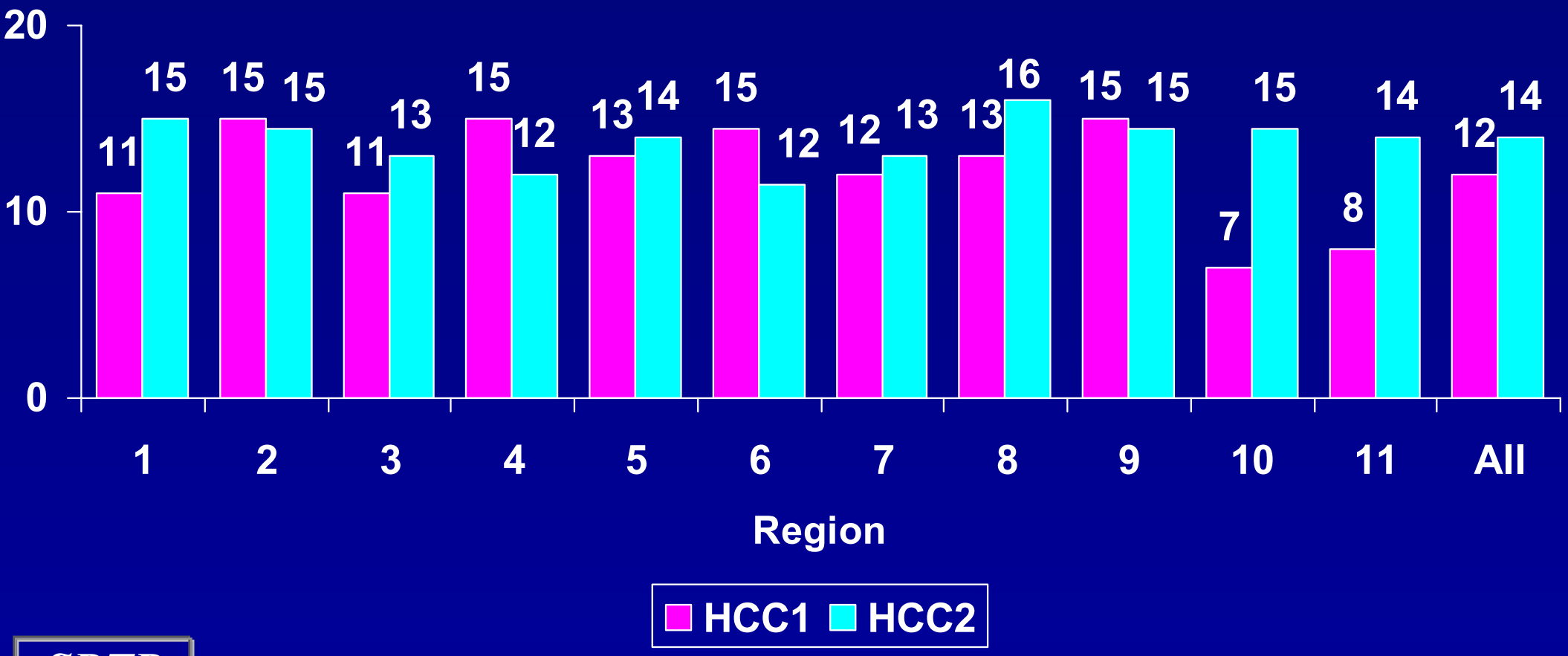
Median Lab MELD/PELD Among HCC Recipients at Cadaveric Transplant by Region



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Transplant Rate Results

- HCC T1 and T2 patients have higher 30-day and 90-day transplant rates than non-HCC patients at the same MELD/PELD scores
- Preliminary results show that HCC T2 patients received ECD liver transplants almost twice as frequently than non-HCC patients with lab MELD/PELD 29

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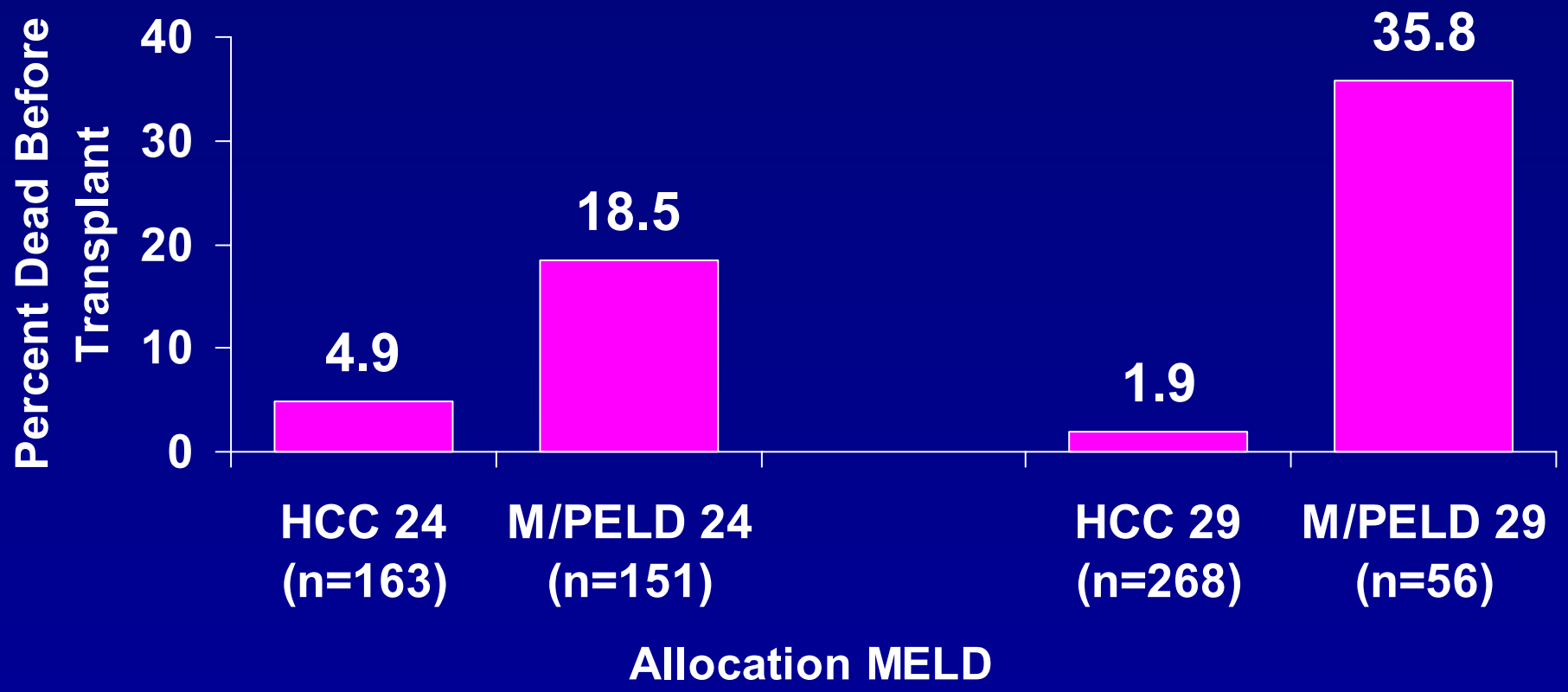
90-Day Mortality Rate by HCC Exception Status



*Unadjusted Cox model of time to death, censoring at removal from the waitlist for reasons other than death (including transplant).

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90-Day Mortality Results

- Death rates for HCC patients on the waitlist are extremely low
- A substantial percentage of non-HCC patients with lab MELD/PELD 29 die on the waitlist within 90 days of listing (35.8%)

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Waitlist Dropouts

- By 90 days after waitlisting, 6.7% of HCC T1 candidates have been removed from the waitlist for reasons other than death, transplant, or "too sick" vs. 1.1% of HCC T2 candidates
- The difference in removal rates may be explained by the longer time on the waitlist of HCC T1 patients, whereas HCC T2 patients receive transplants so quickly (>80%) that few dropouts occur

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LSAM Methods

- Input files consist of waitlist data from 4/1/02-9/30/02
- Used to determine the impact of changes to the exception MELD for patients with HCC:
  - HCC1: MELD 24, HCC2: MELD 29
  - HCC1: MELD 20, HCC2: MELD 24
  - HCC1: lab MELD, HCC2: MELD 24
  - HCC1: lab MELD, HCC2: lab MELD
- Assumes incremental increases in exception scores for HCC patients every 90 days (max=40)

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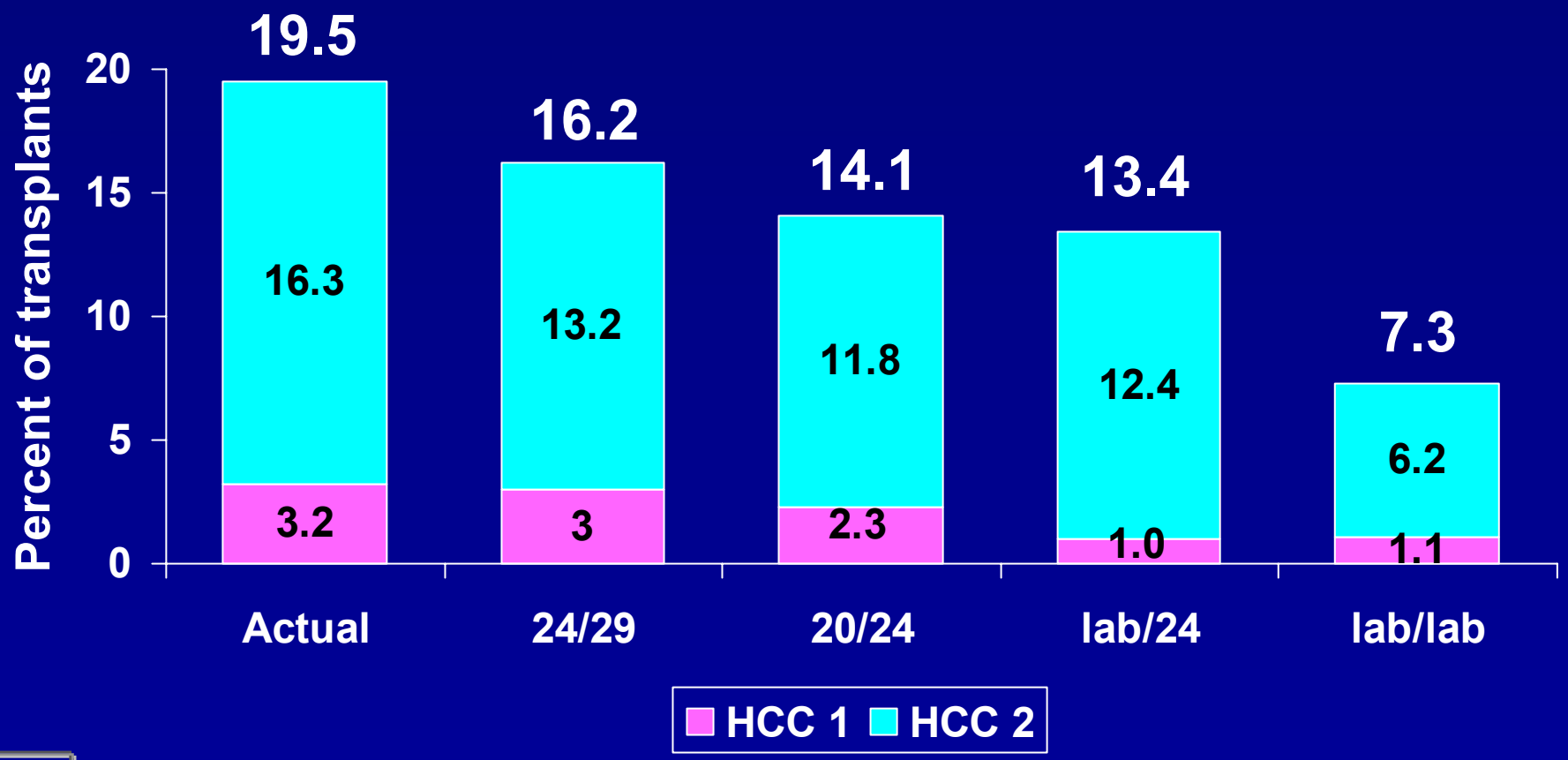
LSAM Results: HCC Transplants as Percent of Total Transplants



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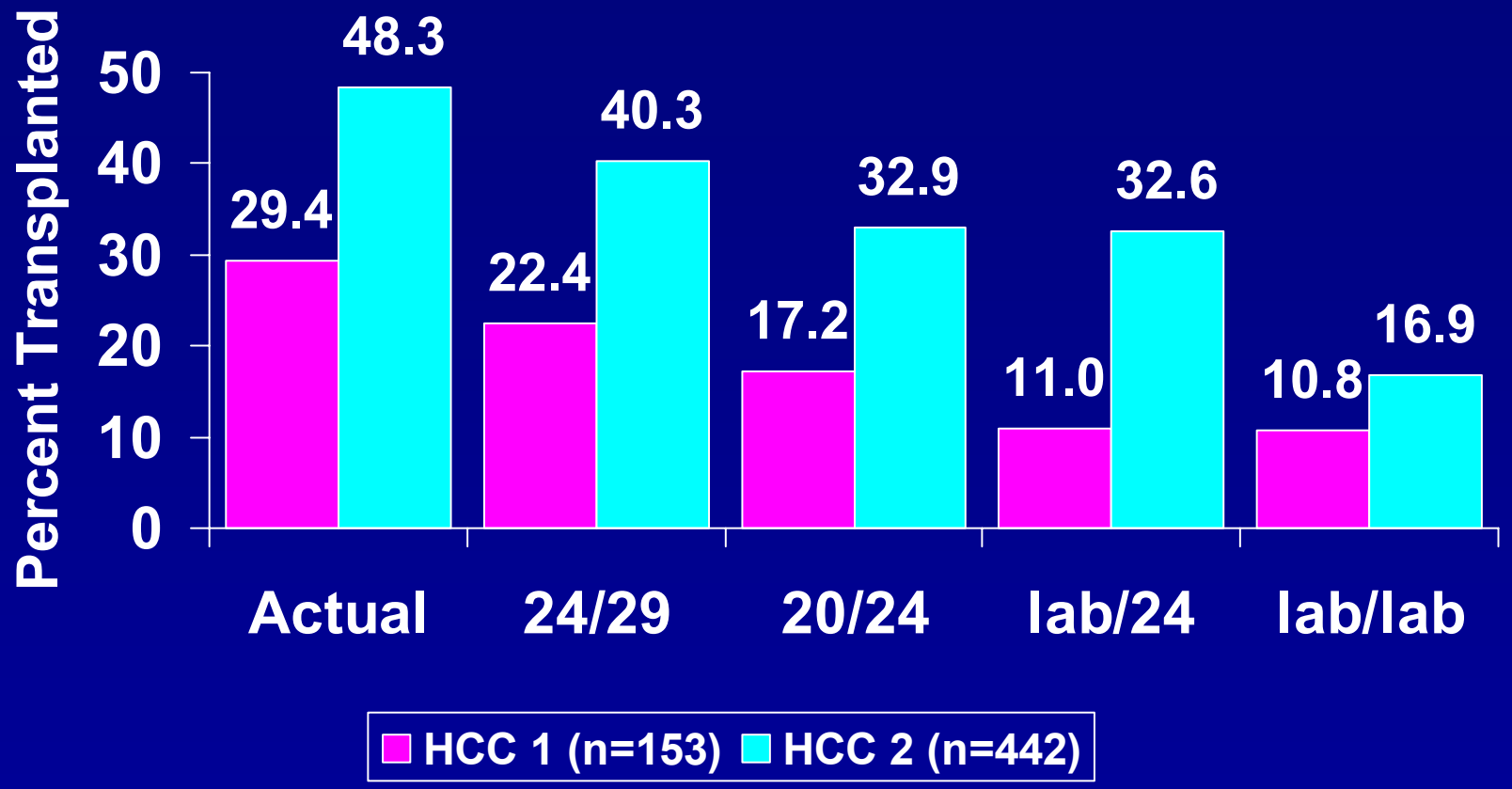
LSAM: % Transplanted in 30 Days

By HCC Exception Status



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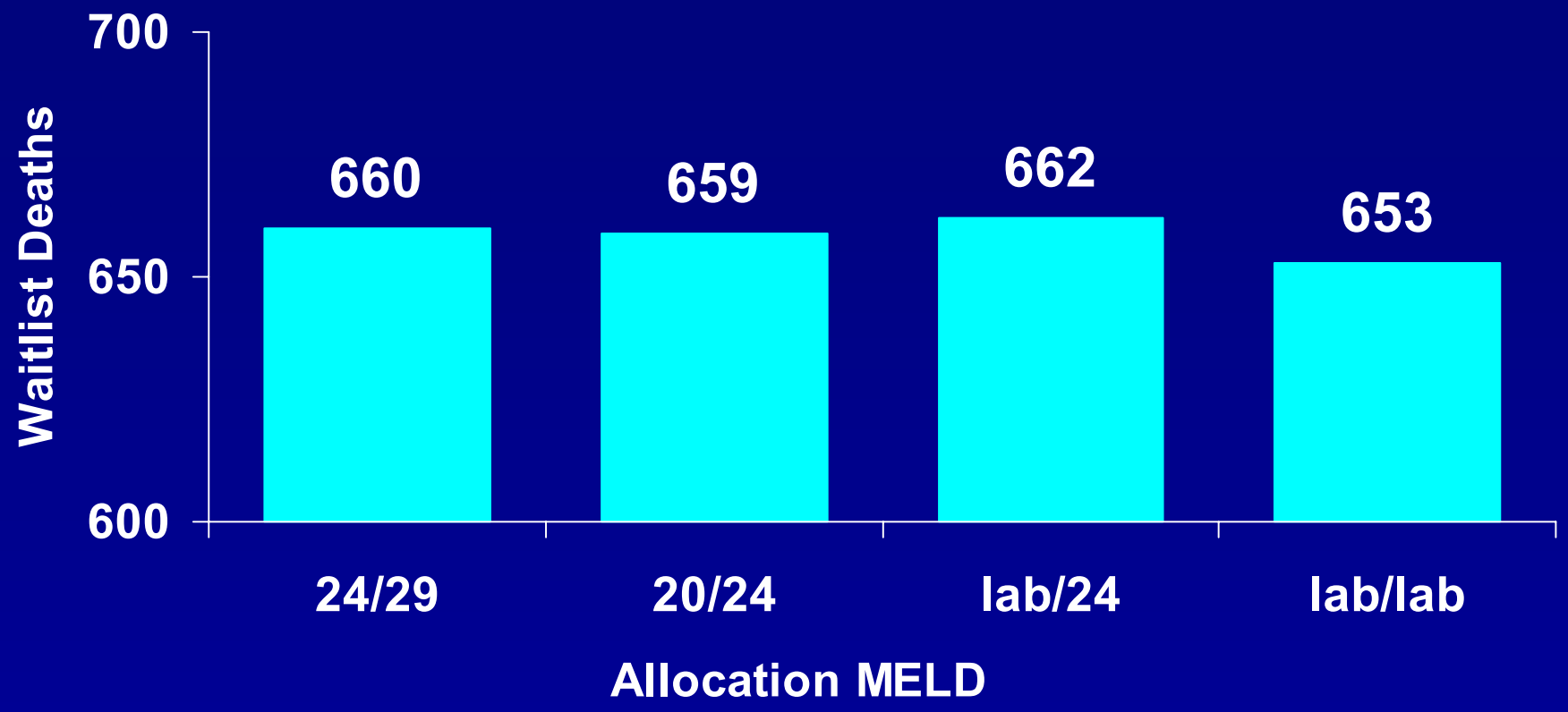
LSAM Predicted Waitlist Deaths by HCC Policy



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LSAM Modeling Conclusions

- Reduction of assigned points to 20 and 24 for HCC T1 and T2 candidates, respectively, is predicted to result in modest reductions in transplant rates for both T1 and T2
- Use of lab MELD for T1 and T2 would reduce each of their transplant rates by 55%
- Waitlist deaths would be reduced by a maximum of 1.1% by eliminating assigned HCC points

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Alternate HCC Allocation Option

- Estimate dropout rate due to progression of HCC (e.g., 5% in 90 days)
- Use the dropout rate as a mortality equivalent to supplement lab MELD
- Assign a variable number of MELD points to the lab MELD based upon the MELD point equivalent of the dropout rate.

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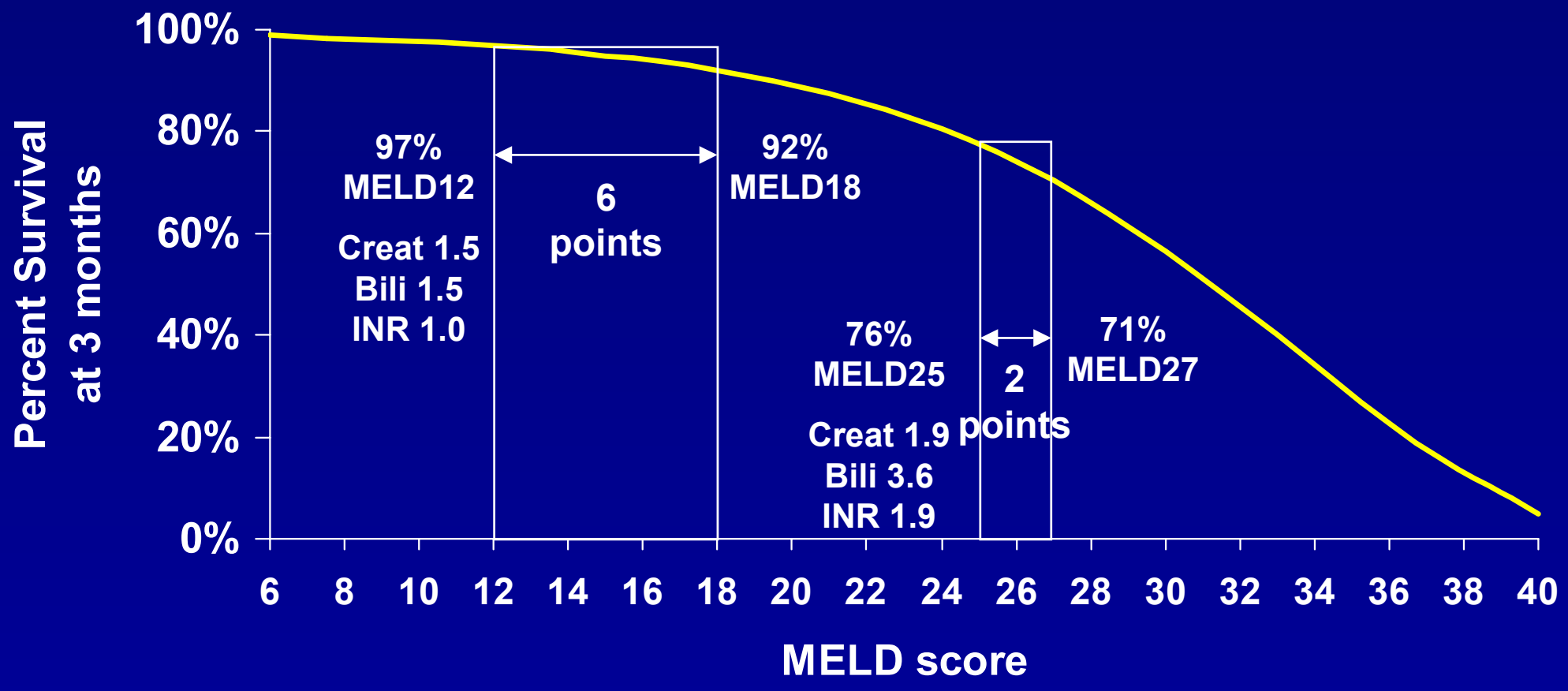
Variable MELD Points for HCC Dropout Mortality Surrogate



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Conclusions

- Dropout rates due to progression of HCC disease should be considered as input for determining the appropriate boost in MELD score
- Variable number of incremental MELD points could be assigned in addition to the lab MELD to incorporate the magnitude of the mortality equivalent associated with dropout
- This methodology may help to "level the playing field" for HCC and non-HCC candidates for liver transplantation

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