



Predictive Analytics in DonorNet[®]



Could Predictive Analytics help support your offer acceptance decision?



What is DonorNet[®] Predictive Analytics?

It's a free decision-making support tool that:

- Aims to increase offer acceptance and kidney utilization, to better honor the gift of life
- Shows transplant teams the potential impact on a patient when accepting or declining an organ offer by using cutting-edge statistical modeling
- Displays a predicted Time-to-next-offer and gives a mortality prediction over that time
- Built on a highly secure, reliable technology foundation
- Monitored by an advisory group and regularly updated by researchers with community feedback
- ***Available now*** for adult kidney offers

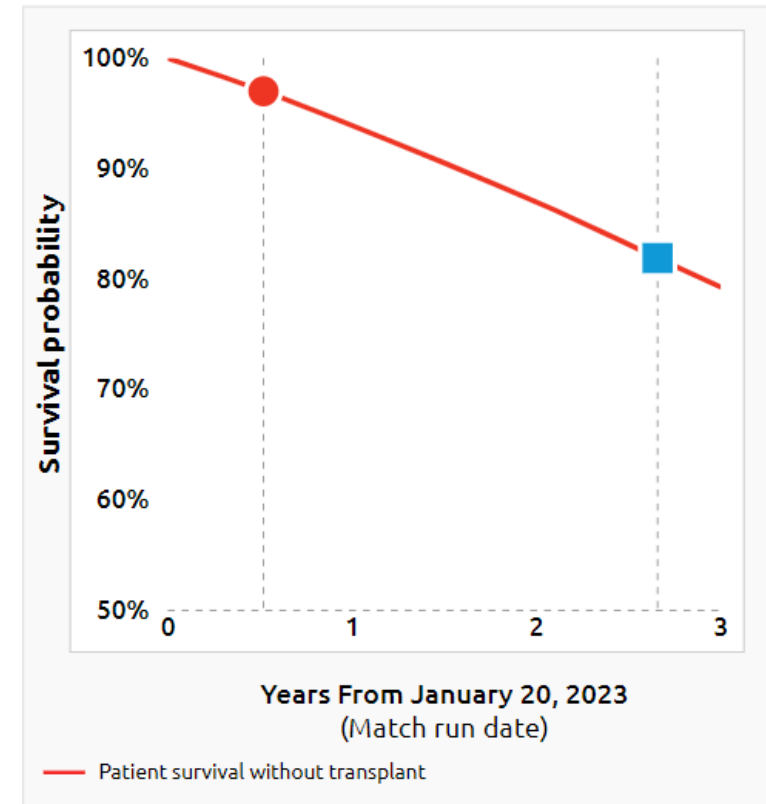
Predictive Analytics

Predictions:

- Time to Next Offer
 - How many months or years until next offer?
 - For this patient, relative to all Kidneys < 30 KDPI

Predicted time to next offer

	KDPI < 30	KDPI < 50
About half of patients like this can expect their next KDPI < 30 offer in 6.3 months and have a 3% chance of dying.		
% Similar Patients	● 50%	■ 90%
Predicted time	6.3 months	2.7 years
Probability of death before next offer	3%	18%



? What is this predicting?

*These predictions are intended to supplement, not replace, clinical judgment in making offer acceptance decisions.

Predictive Analytics

Predictions:

- **Time to Next Offer**
 - How many months or years until next offer?
 - For this patient, relative to all Kidneys < 30 KDPI
- **Waitlist Mortality**
 - How probable is patient death before the predicted Time to Next Offer?
 - For this patient, relative to Time to Next Offer prediction

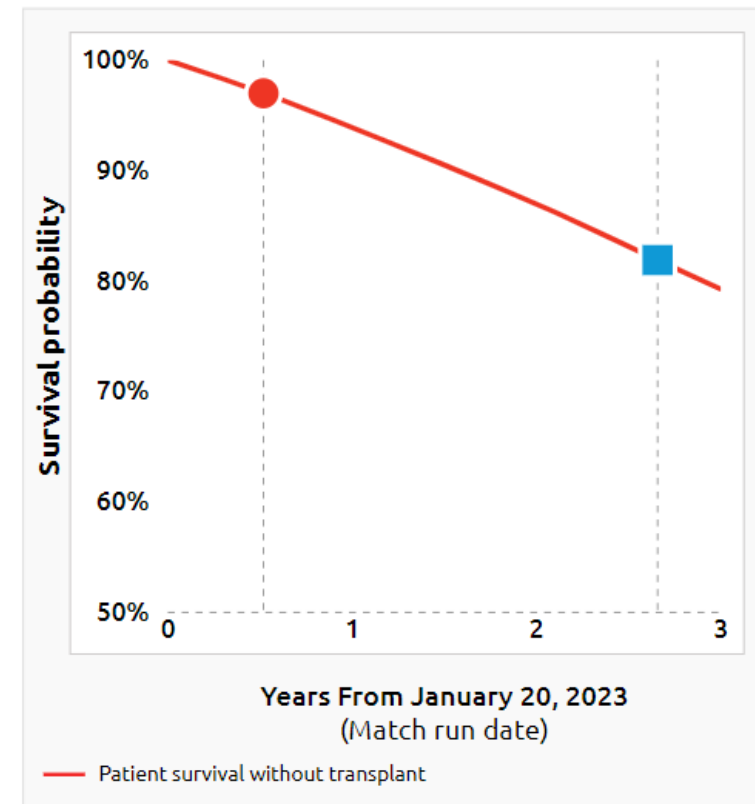
Predicted time to next offer

KDPI < 30

KDPI < 50

About half of patients like this can expect their next **KDPI < 30** offer in 6.3 months and have a 3% chance of dying.

% Similar Patients	KDPI < 30	KDPI < 50
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Predictive Analytics collaboration



BEHAVIORAL SCIENCE

What would be impactful?

DATA SCIENCE

What can be built?

TECH ARCH

How would we build it?

OPTN / Accenture collaboration phases



PHASE I

May – Aug. 2021

Plan, develop
(*concept and behavioral testing*),
and analyze



PHASE II

Sept. – Nov. 2021

Design, build,
and test



PHASE III

Dec. 2021 – 2022

Implement (*beta and pilot testing on real offers in DonorNet[®] Mobile*)



PHASE I



PHASE II



PHASE III

Concept testing

Resonance Testing Interviews (n=8)

- 6 Kidney Transplant Surgeons
- 1 Transplant Nephrologist
- 1 Transplant Center Administrator

Behavioral Study: 16 Simulated Offers (n=53)

- 21 Kidney Transplant Surgeons
- 4 Transplant Nephrologists
- 25 Transplant Coordinator/Administrators
- 5 Other



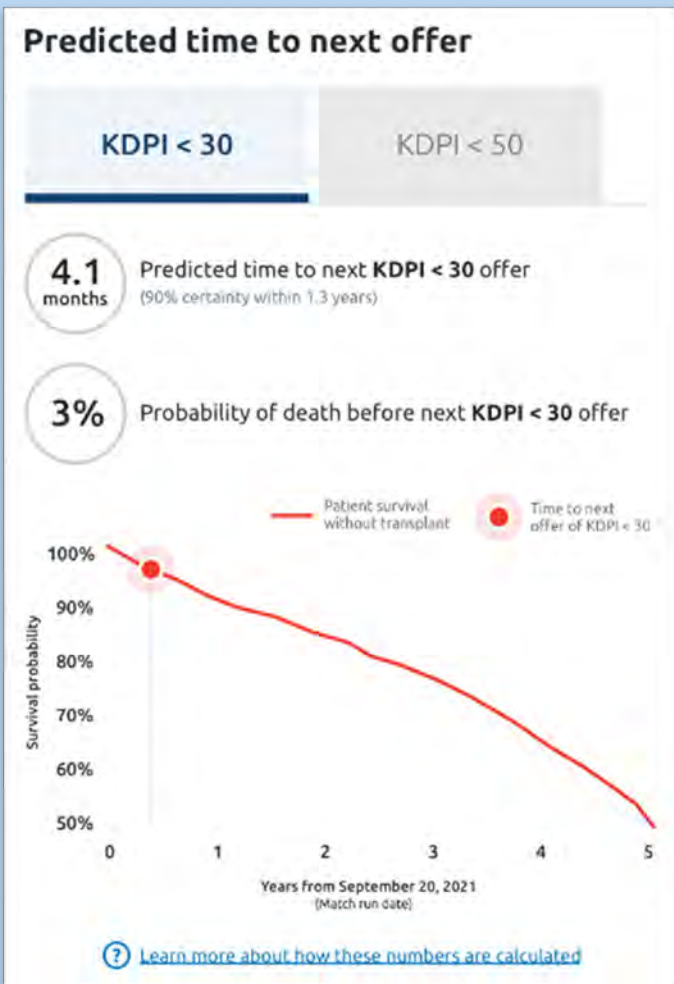
PHASE I



PHASE II



PHASE III



Design

Time to next offer

At <30 KDPI and <50 KDPI

Probability of death before next offer

At <30 KDPI and <50 KDPI

Survival curve for candidate without transplant

- Circle indicates when **next offer** (<30 or <50) is predicted



PHASE I



PHASE II



PHASE III

Implementation

Advisory panel

Nov. 2021 – Present

- Advisory panel of clinical experts to advise on monitoring plan
- Panel will review monitoring reports

Beta testing

Dec. 2021 – Feb. 2022

- Implement Predictive Analytics for a small number (5-10) of users to gather information about technical and user concerns on a smaller scale

Pilot

Feb. – Dec. 2022

- Implement Predictive Analytics for deceased donor kidney offers to adult candidates to a group of 15 programs

National deployment

Jan. 2023

- National roll out will be informed by the findings from the Pilot Phase

**WE ARE
HERE**

Pilot design



PHASE I



PHASE II



PHASE III

15



kidney
transplant
programs using
Predictive
Analytics

*Each participating
program = **Predictive
Analytics (PA) group***

Paired



Predictive Analytics
group is matched
1:1 into pairs

Based on program
characteristics

- *Geographic location*
- *Racial diversity of waiting list*
- *Transplant volume*

2 Treatment groups

PA group
(n=15 programs)
Receives PA on offers*

Control group
(n=15 programs)
**Does not receive PA
on offers***

**Offers viewed on
DonorNet® Mobile*

Pilot results



PHASE I

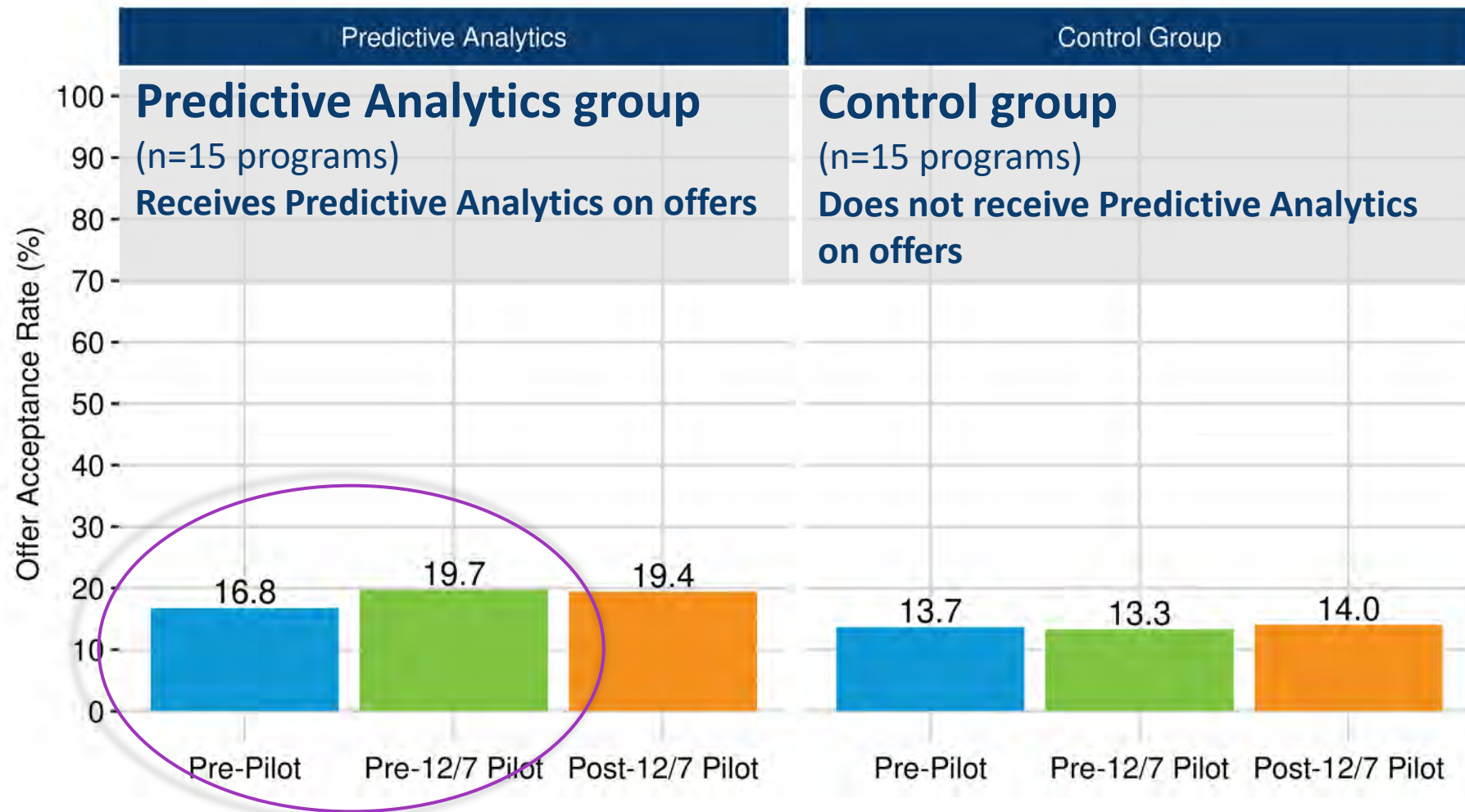


PHASE II



PHASE III

DonorNet® Mobile acceptance by treatment group and period



Revised model
deployed on
Dec. 7, 2022

Summary of Modeling Experience in Pilot

- **Monitoring results are consistent over pilot period**
 - **Models are monitored closely** and will be retrained as needed
 - *Always check user documentation for current model build-time performance*
 - **Program-level reporting of model results is in the works**
 - *We welcome feedback on what would be useful!*

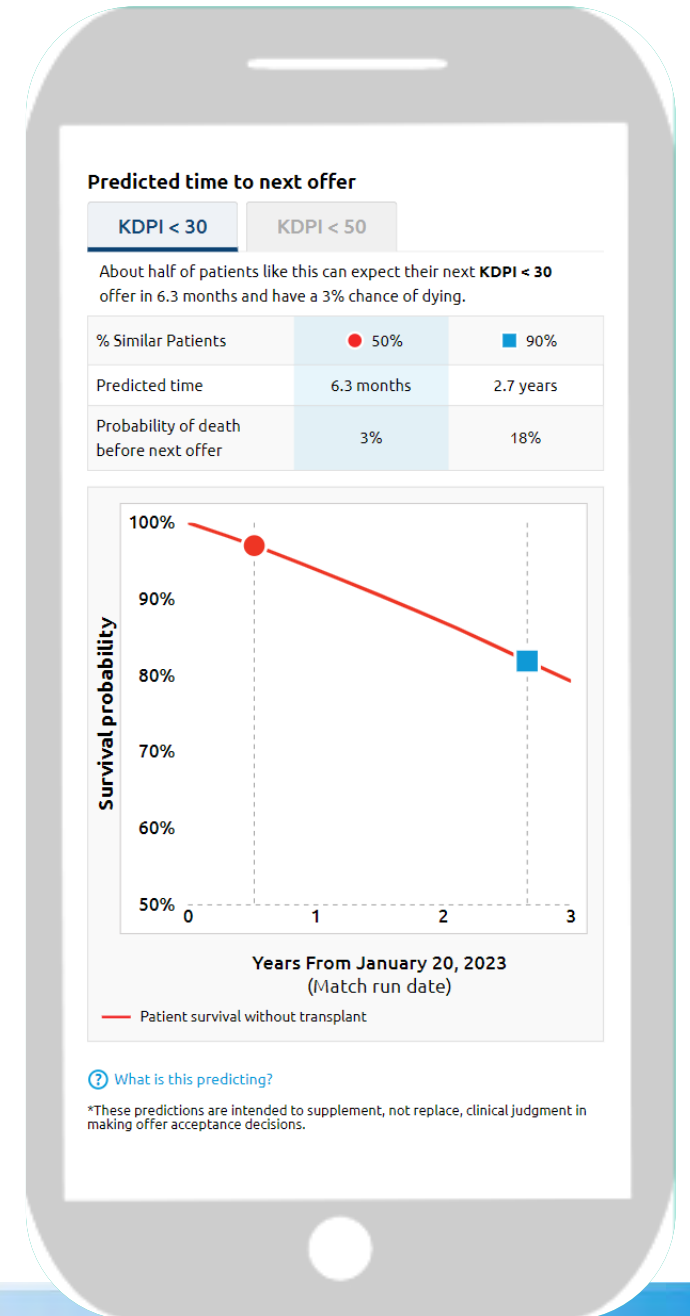
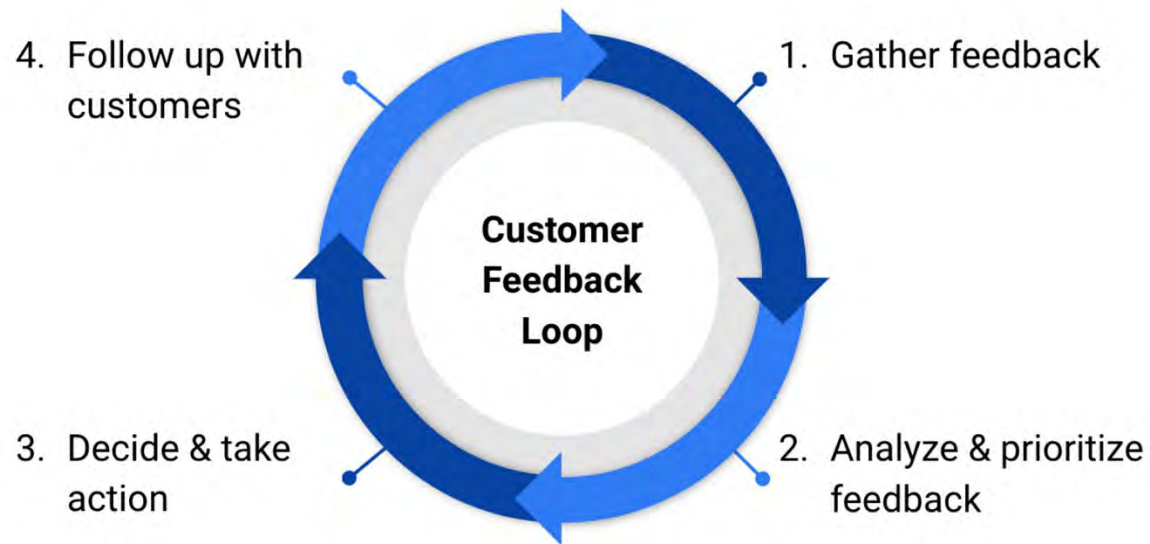
- **Modeling team will continue to improve methodology**
 - Evaluating **new modeling approaches** to better address current limitations
 - Researching **alternate definitions of “next offer”**
 - Developing and utilizing **improved calibration measures**

Understanding the Current Models

Feedback is welcome!
PredictiveAnalytics@unos.org

- **Does not represent certain sub-populations well**
 - Pediatric patients and non-serviceable cohorts do not receive predictions
 - Models do not include prediction adjustment for smaller hospitals
 - Certain factors contributing to match points are not represented by models, *e.g. prior living donors*
- **Does not handle certain modifications over time**
 - Certain patient-level changes that may occur over time, *e.g. BMI, previous TX status*
 - System-wide changes that occur over time will require rebuilding models, *e.g. KAS to KAS250*

National view for Predictive Analytics



Post-National Rollout Timeline

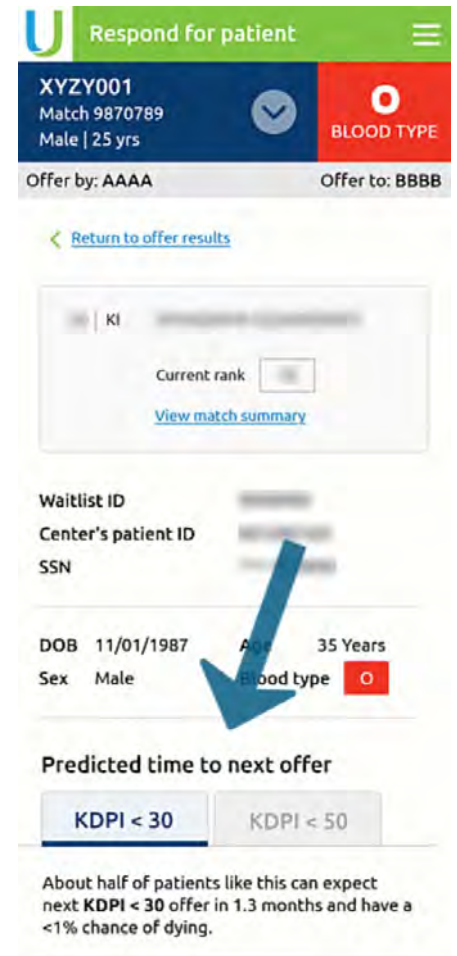
- Attending All Regional Meetings
- Offer Acceptance Collaborative Conference – January 2023
- Transplant Management Forum (TMF) – May 2023
- Next Monitoring Report – Summer 2023

Pathway to get to DNM/Predictive Analytics

<https://donornetmobile.unos.org>



- You can access the link (or scan the QR code) on both mobile phones and desktop
- The predictive analytics appear directly below the candidate's date of birth, age, sex, and blood type



The screenshot displays the 'Respond for patient' interface. At the top, it shows the patient ID 'XYZY001', match number '9870789', and 'Male | 25 yrs'. A 'BLOOD TYPE' indicator is visible. Below this, it shows 'Offer by: AAAA' and 'Offer to: BBBB'. A 'Return to offer results' link is present. The candidate's details include 'KI', 'Current rank', and a 'View match summary' link. A section for 'Waitlist ID', 'Center's patient ID', and 'SSN' is shown. Patient demographics are listed: 'DOB 11/01/1987', 'Age 35 Years', 'Sex Male', and 'Blood type' with a red circle icon. A blue arrow points to the 'Blood type' field. Below this, the 'Predicted time to next offer' section shows two buttons: 'KDPI < 30' and 'KDPI < 50'. A note at the bottom states: 'About half of patients like this can expect next KDPI < 30 offer in 1.3 months and have a <1% chance of dying.'

Further Detail in Documentation

Full documentation includes:

- A walkthrough of visualization elements and definitions
- Model definitions, features, and details
- Model performance and limitations

*Available in UNOSConnect course SYS180
"Predictive Analytics in DonorNet® Mobile"*

The image shows a mobile application interface for DonorNet. The top section has a dark blue background with the title "Predictive Analytics in DonorNet Mobile" in white. Below the title is a white button labeled "RESUME". To the right, a smartphone is shown displaying a notification that says "OFFER ACCEPTED" with a checkmark icon. The bottom section of the image is white and contains the OPTN logo and a paragraph of text describing the predictive analytics feature.

Predictive Analytics in DonorNet Mobile

RESUME

OPTN

The predictive analytics feature in DonorNet MobileSM leverages historical data to improve offer acceptance by providing the predicted time to the next offer and probability of waitlist mortality if the current kidney offer is refused. This course reviews how to locate and interpret this data when reviewing offers for kidney

Take a survey on Predictive Analytics



Link: <https://rcunos.unos.org/surveys/>
Code: TK7CFKXMM

Q&A

Contact us at

PredictiveAnalytics@unos.org