IlLUminate Blog Transcript: David Rea on Health Care, Food and Fairness

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ANNOUNCER: 00:01	[music] This podcast is brought to you by ilLUminate, the Lehigh Business Blog. To learn more, please visit us at business.lehigh.edu/news.
JACK CROFT: 00:13	Welcome. I'm Jack Croft, host of the ilLUminate podcast for Lehigh University's College of Business. Today is December 1st, 2021, and we're talking with David Rea about how to increase fairness and justice in the delivery of basic needs services. Dr. Rea is an assistant professor of decision and technology analytics, or DATA for short, in Lehigh's College of Business. His research integrates predictive and prescriptive analytics methodologies, largely focusing on operational problems and the delivery of basic needs services. Thanks for being with us today, David.
DAVID REA: 00:51	Thank you for having me.
CROFT: 00:52	Now, as I just mentioned, your research focuses generally on improving the delivery of basic needs services. What all does that encompass? What do you mean by basic needs services?
REA: 01:06	Sure. Sure. So if we break it down, right, and think about basic needs, things like food, water, shelter, health care, education-- you can make an argument for other things as well, but basically, it's the providers that help individuals access the services that provide those needs. My work has generally been in health care. I work in hospitals like University of Cincinnati and the Cleveland Clinic, more recently with some food distribution organizations.
CROFT: 01:33	It seems that one of the key underpinnings of much of your research is the difference between fairness and justice. I suspect a lot of people probably use those terms interchangeably. So what are some of the important distinctions between fairness and justice involved in the research you do?
REA: 01:55	Sure. Yeah. It's an insightful point. I think they are often used interchangeably. So my view is simply that justice is a set of principles that guide decision-making, whereas fairness is the perceptions about some individual scenario. And it's obviously much easier to agree on a set of principles versus the fairness of a particular outcome. And so because I work with organizations, I typically view these problems through the lens of organizational justice. Organizational justice breaks it down into three categories: procedural justice, where it's governing the processes, making sure they're consistent, appealable, or transparent; distributive justice, where you're thinking about how benefits or penalties are distributed across individuals; and then interactional justice, which is people's treatment during the decision-making process. And generally, research shows that adherence to these just principles leads to perceptions of fairness.
CROFT: 02:55	And a couple of other terms we should probably talk about up front are equality and equity, which also have different meanings but also are often used interchangeably. So what are the key differences between equality and equity, and how do those factor into your research?

REA: 03:13

This is a key point in a lot of my research is trying to differentiate these two concepts or disambiguate. So when we think about equality and equity, they're two actual components of distributive justice, one of those key points of-- or key parts of organizational justice. So equality is what I tend to see as the default when people say what is fair or what is just. It means that everyone just receives the same outcomes or treatment. Right? Equality, everything's equal. Equity, it's people receive unequal shares or different treatment. And typically, it's due to they have contributed more to the organization or they're in greater need. And you can see how these two concepts-- you can't really have both. Right? You can't both have everyone be equal and reward people for the contributions or acknowledge people's need. And so what my research does is take these two objectives and balance them and find solutions that are more holistic. And this really happens when you have scarcity, is where it becomes really, really important.

CROFT: 04:18

One of the most basic of the basic needs services is food. And during the holiday season, especially, doing something to help feed those in our communities dealing with food insecurity is on the minds of many. Being able to measure need accurately and in a timely manner in different locations and among different populations would seem to be essential to fair and just food distribution, getting food to those who need it most and are the most vulnerable. So what are some of the issues that you've identified that complicate achieving that goal?

REA: 04:53

I see two main issues here. We have lack of data, and we have siloed operations. So when we talk about lack of data, the way we measure food insecurity is through an annual survey. It's given in December, and it asks people to reflect back on the year and identify if they were worried about food or missed meals. And then this data is aggregated to a state level, and it's released with about a two-year delay. Now, this is in contrast with the hunger that people experience. Right? That's an immediate problem that occurs on the order of hours. And so you have emergency food organizations who are doing great work, but they're doing it essentially blind without the ability to understand if they're even moving the needle at all. Right? They're addressing hunger, not necessarily food insecurity. And so this makes it difficult to develop best practices and even to make a case for funding for those organizations.

REA: 05:46

Now, the second part is dispersed resources for families. The way that people access the things they need on the ground level for food is usually through food pantries, which are often run by one or two well-meaning individuals through churches, nonprofits, community centers, and so they don't really have the resources to collaborate and integrate their operations. This means that people who are food insecure and who already have issues with the amount of time they have, have to try and cobble together the resources from a bunch of different organizations. And this can include things like the public schools, the public library, nonprofits, and food banks, along with using things like SNAP [Supplemental Nutrition Assistance Program] to go to the retail food system. This creates a really, really complex situation for families. And so we have organizations doing good work on one hand, but they're doing it blind, and we have people trying to cobble together a bunch of different disparate resources together to make a whole set of meals, which is a whole stressor in its own self, even if you never experience hunger.

CROFT: 06:52

The two-year lag is interesting because when you think about that in the context of what we've been living through over the last two years. So an illustration of that

would be then that a lot of organizations are basing their feeding programs today on data that was collected before the pandemic hit, and obviously, that's changed so much in our society.

REA: 07:21   Yeah, exactly right. Right? So we're using these metrics as targets, but those targets were defined in what was essentially a different world. And this is one of the reasons that the group I've been working with in Cincinnati is trying to create a real-time data system so that you can actually monitor this on a hyper-local level, right, because we're talking about neighborhoods, not even states. Right? So you have a time delay, and then you also have the geographic aggregation. So how we handle this is by getting a bunch of organizations together, helping them integrate their data systems, and then using that data to drive real-time decision-making. And so that's where we're going. Obviously, it's still work in progress, but I think it could be some very useful information. And if there's any good thing that came out of the pandemic, it's creating the cause or the ability to integrate all these organizations together.

CROFT: 08:24   And what is some examples of the more timely data that the organizations have that is not being factored in, at least on a broader level, currently?

REA: 08:40   Yeah. So I should mention all the partners in this. Right? So you have different sets of agencies. So you have nonprofits. And I should say a lot of this work is being driven by Cincinnati Children's Hospital and Carley Riley, who's the lead there trying to organize everything. But then you have the emergency food organizations who all have their own data systems. So Freestore Foodbank is a Feeding America affiliate, and they're very, very large distributor. Right? Feeding America distributes some very, very high percentage of food in the U.S. You also have local organizations like La Soupe who does some cool work rescuing food and turning it into meals and distributing those in a slightly different way than most food pantries. Last Mile Food Rescue does something similar where they are-- you can almost think about them like Uber Eats or rescuing food from grocery stores, stadiums and then getting it to local food pantries. And then kind of more traditional ones like United Methodist Ministries does similar work. So all these nonprofits have their own data about what's going on in their neighborhoods and who they serve, and they typically serve overlapping neighborhoods. Right? So you can see how integrating that data would be useful. You also have local government data like public schools who run feeding programs, the public library who offers other kinds of services or acts as drop-off locations, Job and Family Services, which deals with the SNAP or EBT [Electronic Benefit Transfer] benefits. And a big driver here in Cincinnati has been Councilman Greg Landsman, who's pushed for a lot of this work and organized some of the meetings. You also have private organizations like Kroger, who's lending a hand, and then academic institutions and researchers at the University of Cincinnati, University of Louisville, and then obviously here at Lehigh.

CROFT: 10:27   In terms of the data that they're all collecting, I would assume that, in cases, they're collecting different kinds of data. The collection methods probably are not standardized. What are some of the challenges in aggregating all of this data from a lot of different sources all doing the best they can, but there's no kind of centralized strategy? And I take it that's kind of where you're trying to move things.

REA: 11:02   Yeah. It's a really, really insightful question. So I'll just give you one kind of representative example. So I'll ask you the question, how do you define what a meal is? Yeah. So if you think about-- that's kind of the fundamental unit that we're talking

about here. Right? We're trying to get meals to people. Well, first question is, what is a meal? And all these organizations have their own definitions for what that is. Right? And it could be made up of-- it can be different types of food. And so you can see how you can go in a rabbit hole very, very quickly trying to create a singular definition of what a meal is.

CROFT: 11:41   How do you resolve that?

REA: 11:43   Oh, yeah. I would call that a work in progress. The usual method is to think about pounds. That's kind of the standard. I would argue that we need to go beyond that. There's things to think about like nutrition, cultural appropriateness. Right? If you give people food that they don't know how to cook, it's likely just going to be wasted. You give people food that they don't want, it's likely just going to be wasted. Right? So thinking beyond pounds is something that I think is a general goal of all the organizations involved.

CROFT: 12:14   Right. Because pounds would just be the net weight of whatever it is, which could vary widely and, as you mentioned, have a lot of different implications for health, nutrition, and even satisfaction, which hopefully is a part of this as well.

REA: 12:34   Yeah. Exactly.

CROFT: 12:35   Now, in addition to food distribution, your research has also taken a look at the role that distributive justice that you talked about up front plays in helping to stabilize the workforce and increase worker satisfaction. And that seems especially timely in light of the statistics that just came out recently in September that a record number of Americans, 4.4 million or about 3% of the total workforce, quit their jobs. There are clearly a myriad of factors involved, but in terms of your research, what role could focusing more on distributive justice play in helping to stabilize the workforce?

REA: 13:20   There's a lot of research that has shown the organizational justice for improving the perceptions of concepts and decreased turnover or increased retention. Right? And so my research shows that you can actually embed justice inside systems and how you can do it algorithmically. I'll give you one example from the news recently that kind of popped into my head. Think about the trucking industry. You have drivers are often not paid for the time they spend waiting at docks. So this has always been kind of a nuisance, but because of the backlog at docks, means a driver may wait a long time, say 10 hours. They don't get a load, and therefore they don't get paid. So it's a wasted day. Right? This is inequitable. The driver's not being rewarded for their time. Throw in things like inability to access bathrooms and you have a recipe for someone looking for a different job. So if you can create a just system, you're more likely to retain your individuals or your high-quality workers, which is what any organization would want to do.

CROFT: 14:27   Now, recent research that you've also been involved in examined how scheduling shifts for emergency medicine physicians at a health system's main medical center and two community hospitals could be made more fair. What were some of the issues there that led some employees to believe they were being treated unfairly to begin with?

REA: 14:50   I'll take you back to the three principles of organizational justice. So you have distributive justice and procedural justice, I would say, are kind of the two main factors. So distributive justice is you have people who are unable to work at the

location they wanted, and at the time, that primarily was the main medical center. Various reasons. There are more interesting cases there. You get to work with residents. It may just be because you live closer to there, so it's nicer that you've a shorter commute, that is compared to two community hospitals. The other part is procedural justice. So the original process was fairly opaque. It was done by a small group of senior physicians, and they were trying to schedule some 50-odd people across three locations, which is an extremely difficult task to do manually. But because the process is opaque, you can create perceptions of unfairness even if they're not intended or not even there. And so automating this, I think, helped with, one, the transparency, so helped with the procedural justice. And then also what we've showed through surveys is that it improved perceptions of distributive justice. That is, we're balancing equity and equality. That is not seeking solutions where everyone receives the same, but seeking solutions that reward individuals for their contributions without going to the extreme where those who are, say, the newest or haven't had the time to contribute as much are receiving all of the poor shifts.

CROFT: 16:15

Now let's take a look at, how do you develop a model that balances not just equality and equity among the staff, but also balances the efficiency that the health system desires for the way that its workers are scheduled?

REA: 16:37

Yeah. So I'll talk a bit about the emergency medicine research, and then I'll bring up some of my more recent research as well that deals with these concepts, these problems. So for the scheduling in regards to medicine, what we're doing is we are using what are called-- we're basically trying to discourage inequity and discourage inequality. And so when we design this model, basically, the model's goal is to create an efficient solution, but through some clever design of the objectives, we can kind of encourage the model to move away from unequal solutions and move away from inequitable solutions. And we can balance those two with a parameter and try and find the right place along the spectrum that creates solutions that are both efficient but also appropriately balance the equity and equality with respect to the views of the department and what the department wants to incentivize. And I think that a key point here is that, for that system, the way that we defined equity or defined contributions was through a series of surveys that asked physicians what they thought should be included. And so inclusion in the development process, I think, is pretty critical. And research would agree that it's critical to creating a system that is accepted.

REA: 18:02

In another set of my research, I'm thinking about inter-hospital transport problems. So in these problems, we have multiple stakeholders. We have the system, we have patients, and we have the crews, and each is going to have a different goal for what they actually need. So the system wants an efficient solution. Right? It wants to minimize its costs so that it can keep its profits high and keep costs down for their customers, i.e., patients. You also have the patients themselves need equitable treatment, but as they have different needs, they need to be moved different speeds because, I mean, maybe one person that has a more severe condition needs to move faster than someone else who can stay there, stay in the hospital they're at for an extended period of time. And then you have the crews. They're all salaried. So generally, what you're trying to do is balance your workload, or you're trying to create equal solutions. So we have three stakeholders, three different objectives. How do you balance this inside a model? Well, you use the same kind of method we did in the scheduling process. That is you create an objective that seeks efficient solutions, but

you discourage unequal and discourage inequitable solutions. And the key is trying to balance the treatment of your different stakeholders to find a solution that is acceptable to all.

CROFT: 19:27   Similar to the health system research you were talking about previously, with this one, the crews who were providing the transportation, where did you get the ideas from them, or how did you get the ideas from them of what they considered inequitable or unequal treatment that needed to be addressed?

REA: 19:51   This goes back to the same idea that talked about engaging with the emergency medicine physicians when we're trying to make their schedules. It's engaging with the crews and trying to figure out what their pain points are. Right? So what I did was I went on ride-alongs, figured out what they were doing on a day-to-day basis, talked with them. And kind of a general consensus is if you're, say, one crew and you're running back and forth between a bunch of hospitals basically working all the time and you see that your colleagues are sitting over at the main medical center doing nothing, you're a little bit dissatisfied. Now, the reason that situation actually happens is because you have different crew types. You have some that are reserved for high-acuity patients. They have more training - usually, they have a nurse on board is the main difference - whereas you have perhaps a crew with lower training, and so sometimes they will be used more by the dispatcher. It creates a sense of inequality. You have some crews working way too much, some crews potentially not working enough. So you need to balance these two. But you're also balancing it with the needs of patients because you do want to make sure you have that high-acuity or highly trained crew available for high-acuity patients. You're trying to balance this equal treatment of your crews versus the equitable treatment.

CROFT: 21:08   It strikes me, the human factor in these. If you want to know how to make the scheduling more fair or equitable, you ask the physicians involved. If you want to know how to make the crews that are riding in the transportation more fair and equitable, you ride with them. You hear what they're talking about, what they think. What brings that to mind is that there's a lot of talk these days about how artificial intelligence or AI can play a role in developing algorithms that remove human bias from the equation in designing systems that are more fair. So it's kind of like, how do you get that-- how do you strike that balance with positive human factors and eliminating human bias from it? So what are some of the pluses and minuses in terms of the potential of AI to build the kinds of and design the kinds of more fair and just systems that you're seeking to build?

REA: 22:19   Yeah. So I'll go back to same thing I said in the very beginning, where my view is when you think about justice, you can create some objective principles, and this is what I'm trying to embed into models. Right? Balance equity. Balance equality. These are principles. What they should hopefully result in are outcomes that are perceived to be fair or subjectively fair. Right? Fairness is subjective. So when you think about AI, how can we develop these kinds of algorithms that remove that human bias? Well, you have to think about the data that you're putting in. Right? AI is not a panacea to human bias. It will reflect the data that it is given. And we need to remember that data's not reality. It's a reflection of the system that created it. And those systems were designed by humans. And often, the data was manually entered by humans, which means that it often contains our implicit bias. And so any AI trained on data may actually end up reflecting our own biases.

REA: 23:22

So I'll give you two examples that come to mind. One is from an Amazon hiring algorithm that came out a few years ago. Essentially, their goal was to try and predict who would make it up into upper-level management. And so what they did was they trained their algorithm based on who was in upper-level management and said, "Okay. We're going to use this to decide who we hire." Well, as you might imagine, as with most companies, the people in upper-level management are generally white men. And so what ended up happening, even without putting race into these, you have an algorithm that ends up hiring mostly white men. And they ended up cutting off this for this reason because they realized what was happening. I'll give you another example, comes from an algorithm that was designed to actually sentence people who are convicted of crimes. What they did was they used some prediction algorithm to try and say, "Will this person commit more crimes if we don't put them in jail?" And it ended up that the algorithm-- we fed in the data. It produces biased results because the data was based on previous human decisions which reflect our own biases. So I think a major challenge with artificial intelligence here is not necessarily that we want to push all the responsibility on there, but the question is how we can integrate that algorithmic decision-making with human decision-making to get to the best possible outcomes and probably acknowledging that we're never going to be perfect. Right?

CROFT: 24:55

David, thank you so much. I think that's the time we have for today, but you've given us a lot to think about. There seems to be a lot of balancing of a lot of different things in the work that you do to build a more fair and just system for the basic services that a lot of people need. So thanks for being with us today.

REA: 25:16

Thank you so much for taking the time to chat with me.

CROFT: 25:19

I'd like to, once again, thank my guest, David Rea. Motivated by practice, he has collaborated with health care and humanitarian organizations, as we've just talked about, including University of Cincinnati Health, the Cleveland Clinic, Cincinnati Children's Hospital, and the Freestore Foodbank, the largest emergency food and services provider to children and families in Greater Cincinnati. In addition to his primary appointment with the College of Business, David holds a courtesy appointment with the College of Health. This podcast is brought to you by ilLUminate, the Lehigh Business Blog. To hear more podcasts featuring Lehigh Business thought leaders, please visit us at business.lehigh.edu/news. And don't forget to follow us on Twitter @LehighBusiness. This is Jack Croft, host of the ilLUminate podcast. [music] Thanks for listening.