

1

00:00:23.100 --> 00:00:29.200

Dean's Lecture Series: Okay. good morning, everyone. It is 90'clock, and so we will get started.

2

00:00:29.310 --> 00:00:37.849

Dean's Lecture Series: Welcome to another installment of Dean lecture series. I'm Shanaya Turner Smith, one of the Learning and development managers for Odi.

3

00:00:37.970 --> 00:00:44.310

Dean's Lecture Series: This session will be recorded and shared out within 2 days to all those who have registered for this event.

4

00:00:44.340 --> 00:00:49.970

Otherwise the recording can be found under the education and training tab of the Odi website.

5

00:00:50.510 --> 00:00:55.369

Dean's Lecture Series: Live transcription has been enabled as well. Let's enable that.

6

00:00:59.720 --> 00:01:00.580

Dean's Lecture Series: See here.

7

00:01:09.130 --> 00:01:29.660

Dean's Lecture Series: Okay, so that has been enabled. So please ensure that you use the closed captions. if that is something that you would like for this session. But please note that the live Screen Transcript is not perfect. but we will have that on the website. I I edited Virgin on the website. following today's session.

8

00:01:29.850 --> 00:01:41.979

Dean's Lecture Series: we ask that participants. Please use the Q a. Function instead of the chat for today, we will do our best to answer your questions. But please understand we are working within a set window of time.

9

00:01:42.040 --> 00:01:55.640

Dean's Lecture Series: Should we not get to any of your questions, we will work with the presenters to get any unanswered questions posted on the Dean Lecture series. Webpage. Paste it in the chat you will find links to the Dean lecture series. Website.

10

00:01:55.740 --> 00:02:05.250

Dean's Lecture Series: so please email us if you have any questions or concerns. But I will now turn it over to Dr. Hawks to introduce today's guest lecture.

11

00:02:06.330 --> 00:02:18.020

Kris Hogquist: Good morning, everyone. Welcome to this morning Steve's lecture. It's my pleasure to welcome today's guest, Dr. Greg Bielman, who will be speaking on combat casualty care lessons for care in the rural settings.

12

00:02:18.520 --> 00:02:28.729

Kris Hogquist: There have been significant advances in combat, casualty care over the last 2 decades as a result of investments in care for patients injured during operations in Iraq and Afghanistan.

13

00:02:28.830 --> 00:02:44.309

Kris Hogquist: and these advancements have helped inform improvements in civilian trauma care in several ways. Predictions for future conflicts include major changes in the environment to provide care which in many ways mirrors, challenges in providing care in a rural settings.

14

00:02:44.560 --> 00:03:07.169

Kris Hogquist: Dr. Beeleman will discuss what's ahead for his presentation in his presentation, and how clinicians and trainees can put it into future practice for our State. A general surgeon and Icu physician, Greg Bielman, currently serves as the Associate Dean for Dod research and Partnerships, Director of the Translational Center for Recessive Trauma care and professor in the Department of Surgery.

15

00:03:07.310 --> 00:03:14.040

Kris Hogquist: He also recently served as Senior Vice President of acute operations for the Minnesota health, health, Fair View health system.

16

00:03:14.310 --> 00:03:20.259

Kris Hogquist: the largest health system in the State of Minnesota, where he co-ed the system response to COVID-19.

17

00:03:20.640 --> 00:03:37.179

Kris Hogquist: Greg has an active translational research program funded by the Department of Defense. The Nih and Industry. Greg is a retired colonel in the army reserves, and has deployed 5 times, serving during one deployment as the Centcom Joint Theatre trauma system director in Iraq and Afghanistan.

18

00:03:37.510 --> 00:03:48.510

Kris Hogquist: Greg has significant experience in global health efforts with his experience in the army, a decade of patient care and research efforts in Uganda and recent efforts in Ukraine.

19

00:03:48.550 --> 00:03:51.499

Kris Hogquist: Greg, thank you so much for being with us today.

20

00:04:03.370 --> 00:04:25.839

Greg Beilman: thank you, Dr. Hodquist. thanks to Dr. Nunes for the invitation to speak today. And Miss Turner Smith. Thank you for the amazing coordination that you provided in setting this lecture up. what I'd like to speak to you folks today about is

21

00:04:25.880 --> 00:04:31.679

Greg Beilman: combat casually care, and why it matters to us in the State of Minnesota.

22

00:04:31.820 --> 00:04:45.910

Greg Beilman: I have a number of disclosures that you can see here. the most important disclosure is the first bolded bullet point, which is that many of these pictures are used from the Internet.

23

00:04:45.910 --> 00:05:04.969

Greg Beilman: They are displayed, using the doctrine of fair use as an academic use of this material. Also. Important is the fact that as a former soldier, my comments are my own, should not be seen as reflecting the views of either the Department of the Army or the Department of Defense.

24

00:05:05.930 --> 00:05:11.110

Greg Beilman: I'm going to start with something completely unrelated to

25

00:05:11.260 --> 00:05:28.510

Greg Beilman: what I'm going to talk about. And this is a poem that I saw in last week's jam I originally published 40 years ago, called Gadamus egotur, which in Latin means. Therefore let us rejoice.

26

00:05:28.650 --> 00:05:49.889

Greg Beilman: I'm going to suggest for those of you who are willing to spend the 5 min of reading this entire poem that you will get a lot out of it. it for me. It spoke to me as why I went into the medical profession to start with. I'm going to read for you several lines.

27

00:05:49.910 --> 00:05:58.440

Greg Beilman: and then go on my my real talk. for this is the day, you know too little against the day when you will know too much.

28

00:05:58.700 --> 00:06:02.840

Greg Beilman: for you will be invincible and vulnerable in the same breath.

29

00:06:03.230 --> 00:06:15.160

Greg Beilman: which is the breath of your patients for their breath as our breathing and our reason for the patient will know the answer. and you will ask him ask her.

30

00:06:18.810 --> 00:06:34.139

Greg Beilman: So in the next 40 min or so I would like to cover briefly a history of combat casually care. I would like to talk about some of the learnings if I can say it that way of the last war.

31

00:06:34.160 --> 00:06:42.330

Greg Beilman: and some of the planning for medical care that we are doing. for what may be the next war.

32

00:06:42.900 --> 00:07:00.520

Greg Beilman: Talk to you a little bit about what this means for us in Minnesota, and then spend the last 5 min or so. talking about the efforts of the tech, the translational center for resuscitative trauma care here at the University of Minnesota

33

00:07:02.640 --> 00:07:24.889

Greg Beilman: as a surgeon. I strongly believe that we have made major advances in surgical care in particular, thanks to unfortunately the fact that every time we fight a war Surgeons and the medical system are dealing with how to clean up the mess that has been created by war.

34

00:07:24.890 --> 00:07:36.930

Greg Beilman: And here are a couple of famous quotes from Hippocrates and some of a native Minnesotan William Mayo. Speaking about World War, one

35

00:07:39.010 --> 00:08:06.340

Greg Beilman: Ambrose par a was a French barber surgeon who lived between 1,510 and 1,590. He was a pioneer of battlefield medicine One of his famous quotes, that I still think about as I care for my patients is I bandaged him. God healed him, and it still amazes me as a surgeon. Every day that we do. These large interventions in our patients

36

00:08:06.440 --> 00:08:14.309

Greg Beilman: sit back and wait for God or the patient to heal themselves. After our interventions

37

00:08:14.430 --> 00:08:41.570

Greg Beilman: one of his major advances was in ligature for stopping bleeding in a wound suffered after cannon injury before Ambrose par a. The typical use was cottery used by irons heated in a red hot fire and boiling oil to obtain local bleeding control.

38

00:08:41.669 --> 00:09:07.540

Greg Beilman: Ambrose par a noted the day after he ran out of the resources to use irons when all he had was cotton ligatures that these patients did not have the septic shock typical of patients after using cottery and describe this as a new way to take care of patients with a major bleeding

39

00:09:09.350 --> 00:09:24.769

Greg Beilman: the Civil War Here in the United States was the bloodiest Us. War with over 750,000 deaths of soldiers on both sides of the war. Several 1 million deaths of civilian casualties

40

00:09:24.880 --> 00:09:49.090

Greg Beilman: The most injuries caused during this war were from musketry and caused by the Minneapolis, and you can see several examples of them in a ball in the right lower quadrant of my slide here. This was much more destructive than the old musket ball. that was basically around a piece of lead.

41

00:09:49.090 --> 00:10:05.440

Greg Beilman: there were a number of adv of advances made during this war, including the Sanitary Commission which, unfortunately, was brought into operation too late, and a 3 tiered evacuation system,

42

00:10:05.960 --> 00:10:16.379

Greg Beilman: principles of which we still use to this day the most common operation was an amputation. We had absolutely no understanding of the germ theory of disease

43

00:10:17.350 --> 00:10:20.110

Greg Beilman: skipping forward 100 years

44

00:10:20.170 --> 00:10:41.790

Greg Beilman: and the Warlord to in the Korean War. This is a quote from Lieutenant General Leonard Heaton, who was the Surgeon General of the armory during during World War li. He quotes, he says, if any single medical program can be credited with the savings

45

00:10:41.790 --> 00:10:50.959

Greg Beilman: of countless lives in World War li. And the Korean War. It was a prompt and liberal use of fresh! All blood to resuscitate these casualties.

46

00:10:53.400 --> 00:11:17.400

Greg Beilman: What has really changed in the last 50 years or so of war has been the application of medical research to war, and this is one of my personal. Here's heroes Dr. Basil Pruitt. He was a scientist and a burn surgeon and really drove the advances in.

47

00:11:17.470 --> 00:11:25.900

Greg Beilman: Not just burn research, but combat casually. Care research over about 30 years at the Us. Army Institute of Surgical Research

48

00:11:25.930 --> 00:11:32.199

Greg Beilman: at the brook Burn Center Basel was

49

00:11:32.340 --> 00:11:52.380

Greg Beilman: critical and identifying how to safely resuscitate patients after burn injury. He was involved in helping characterize the metabolic stress response to injury, shock and burns help drive long distance, aromatical evacuation of injured patients

50

00:11:52.380 --> 00:12:02.410

Greg Beilman: and the Isr has done extensive research in multiple areas of combat casually. Care over this last 40 years.

51

00:12:02.440 --> 00:12:14.170

Greg Beilman: Basil, I just a comment, was a personal friend and mentor of mine for 20 years, until his passing about 4 years ago.

52

00:12:16.060 --> 00:12:34.730

Greg Beilman: Unfortunately, over the last 20 years, we have spent an incredible amount of money on on war, 2.3 trillion dollars in direct costs to fight the wars in Iraq and Afghanistan overall costs of nearly 8 trillion dollars

53

00:12:34.780 --> 00:12:52.999

Greg Beilman: with 7,000 Us. Service members killed, 58,000 service members wounded, and nearly a million deaths In Us. Military service members, allied fighters, opposition fighters, civilians, journalists, humanitarian aid workers, and others.

54

00:12:53.940 --> 00:13:17.330

Greg Beilman: and again, unfortunately, the only winter of those conflicts over the last 2 years my personal opinion has been a better understanding of how to take care of severely injured combat casualties, including a better set of understandings for how to get rapid hemorrhage control that includes tourniquets.

55

00:13:17.410 --> 00:13:25.989

Greg Beilman: training of those in the field, damage, control, resuscitation and pharmacologic adjuncts of therapy.

56

00:13:26.410 --> 00:13:29.649

Greg Beilman: Additionally, we have developed new tools.

57

00:13:29.720 --> 00:13:44.380

Greg Beilman: training techniques and importantly, systems of care that have led to the lowest casualty rate and death rate of any described. a war that has ever been fought in the history of mankind.

58

00:13:46.040 --> 00:14:02.999

Greg Beilman: what in my mind is related to this good outcome is this concept of one hospital on 3 continents? One important feature of that is doing what the patient needs to stabilize the patient, but not doing more.

59

00:14:03.300 --> 00:14:16.309

Greg Beilman: Early in this conflict I was sitting in a combat sport hospital in Iraq. dealt with a young man who had a vascular injury. I thought I was a pretty good surgeon and I still think I am.

60

00:14:16.490 --> 00:14:40.569

Greg Beilman: I did a reverse staff and a Spain graph to this patients distal extremity, injury. The next day the extremity injury or the next day my graph went down a repair. That graft also failed. The patient ended up with an amputation And then was evacuated back to launch stool and then back to the United States

61

00:14:40.930 --> 00:14:51.640

Greg Beilman: This patient came back to see me 8 weeks later in Iraq, where? Where I still working as a member of his unit, which is amazing.

62

00:14:51.720 --> 00:15:20.919

Greg Beilman: but what we learned and a number of other people learned the same way is, Dr. Bielman should not have been doing a vascular operation in the field. I should have been putting Shaunson getting this patient to launch tool where they could do a good vascular operation under the right settings, and with the right equipment to give him the best chance of saving his limb and his extremities moving forward.

63

00:15:20.940 --> 00:15:42.009

Greg Beilman: And so an important part of this concept was Dr. Bielman doing what he needed to do to save and stabilize his patient, getting him in the helicopter, the back to the next level of care, and all the way back to the United States, where he could receive or she could receive, all the care that they need at the appropriate time

64

00:15:42.430 --> 00:15:56.659

Greg Beilman: and again this concept of one hospital over 3 continents really resulted in really amazing outcomes. And one of the privileges of my career has been the participation in that work.

65

00:15:58.540 --> 00:16:01.059

Greg Beilman: What about the next war? However.

66

00:16:01.480 --> 00:16:10.439

Greg Beilman: I think there are likely to be significant changes in the way we deliver medical care for patients in the next war.

67

00:16:10.940 --> 00:16:18.490

Greg Beilman: One of the reasons for that is that this will be a near peer or a peer-to-peer conflict. If you think about

68

00:16:19.210 --> 00:16:25.100

Greg Beilman: who are a potential antagonist in the news.

69

00:16:25.210 --> 00:16:39.399

Greg Beilman: Those antagonists are likely to have very similar air forces as we do. We're unlikely to have air superiority. We're also likely to be fighting across a very

70

00:16:39.740 --> 00:16:55.280

Greg Beilman: broad geography rather than in Iraq and Afghanistan areas of operation that are fairly limited and small. These areas of operation may include half of the East Pacific

71

00:16:55.350 --> 00:17:06.999

Greg Beilman: or large land masses where we are not able to deliver patients across the area of operations rapidly.

72

00:17:07.230 --> 00:17:24.320

Greg Beilman: And so we have to think carefully about what we're going to need for these patients. And the needs will include things like delivering care for several days before you can safely evacuate patients to a higher level of care.

73

00:17:24.720 --> 00:17:30.970

Greg Beilman: The golden hour before reaching a high level of trauma care may no longer be possible.

74

00:17:31.780 --> 00:17:47.040

Greg Beilman: you will likely be dealing with a lower level of expertise with an independent duty. Cormorant, providing much of this care rather than a general surgeon or vascular surgeon, or other advanced of care providers

75

00:17:47.400 --> 00:17:57.340

Greg Beilman: The challenges that these people will face, and caring for our patients will include stabilization of shock for much longer periods of time.

76

00:17:57.450 --> 00:18:00.039

Greg Beilman: providing pain control in the field.

77

00:18:00.160 --> 00:18:22.050

Greg Beilman: managing the airway and then importantly doing standard nursing care, which, when I was a surgery resident, I thought was silly. And what you figure out very soon is This. The surgeons play a subsidiary role to the importance of nursing care in taking care of most of these patients issues.

78

00:18:22.750 --> 00:18:51.289

Greg Beilman: So if you go back to my earlier slide of one hospital on 3 continents. We are going to be front loading much of the care that we were able to do at a combat support hospital in theatre, at launch, stool, Regional Medical Center, or other evacuation hospitals out of theater and back in the United States. Much of that care is going to be delivered in the field to provide for those patients.



79

00:18:52.010 --> 00:19:07.979

Greg Beilman: And this will lead to those specific problems, including stabilization of shock, how to monitor patients for things that are going wrong and help How help the Corman intervene appropriately?

80

00:19:08.090 --> 00:19:20.750

Greg Beilman: How to do safe wound care? How do we train the medic of the future? And how do we give those medics appropriate communications about how to take care of these patients?

81

00:19:20.760 --> 00:19:35.569

Greg Beilman: And one of the cool questions to ask is, How does the new it the new AI feed in to be able, being able to more effectively provide care.

82

00:19:38.330 --> 00:19:44.540

Greg Beilman: So what the heck does this have to do with what you and I do in the State of Minnesota.

83

00:19:45.060 --> 00:19:52.539

Greg Beilman: I'm going to propose to you that there are very similar situations in many parts of our State.

84

00:19:53.030 --> 00:20:01.360

Greg Beilman: What about Dr. Bielman doing a stupid thing in the boundary waters and fracturing his femur

85

00:20:01.500 --> 00:20:14.389

Greg Beilman: and the prolonged evacuation that's likely to be the case when I fracture my femur in the boundary waters before getting to essential and to lose where they have a level one trauma center.

86

00:20:15.880 --> 00:20:31.339

Greg Beilman: What happens in the State of Minnesota in February, when we get a 13 inch snow, and the helicopters aren't flying and the highways are shut down, and you're putting

87

00:20:31.440 --> 00:20:36.979

Greg Beilman: my uncle in the back of an ambulance with somebody that's had.

88

00:20:37.060 --> 00:20:57.259

Greg Beilman: like most ambulance drivers and caregivers have had 6 weeks of online training, 2 weeks of in-person training, and then they are transporting this patient 6 h to sync cloud or to a trauma center in the Twin Cities, or a trauma center in Rochester.

89

00:20:58.080 --> 00:21:04.270

Greg Beilman: To me that sounds a lot like what the military is doing and talking about

90

00:21:05.010 --> 00:21:15.480

Greg Beilman: in Minnesota. Trauma remains the fourth highest cause of death for Minnesotans. It costs us 2.5 billion dollars a year in annual health care costs

91

00:21:15.700 --> 00:21:22.900

Greg Beilman: and getting back to what I was just talking about. If you are injured in a vehicle. Crash in rural Minnesota.

92

00:21:23.090 --> 00:21:42.920

Greg Beilman: You have a the the fatalities associated with that make up 2 thirds of fatal crashes in rural areas compared to urban areas. And that's very similar to the military setting that we've spent the last 20 min talking about.

93

00:21:45.480 --> 00:21:59.149

Greg Beilman: Rural trauma is the trauma is the most common cause of death for those in Minnesota and across the United States for people younger than 46 years. Unfortunately for me, that no longer applies to me

94

00:21:59.670 --> 00:22:14.200

Greg Beilman: deaths for motor vehicle, crash, occupational injury, drowning unintentional fire, arm injury all. Increase the further you are away from a urban environment.

95

00:22:15.080 --> 00:22:31.479

Greg Beilman: And that and your likelihood of death at the scene is 72%. If you're involved in a motor vehicle crash in a rural environment compared to 41% in an urban environment.

96

00:22:32.040 --> 00:22:47.429

Greg Beilman: By the way, this is my friend Rick Sidwell, who is a trauma surgery surgeon in Iowa. driving his tractor last year. to promote the importance of doing a better job at Earl trauma. Care?

97

00:22:49.200 --> 00:22:58.170

Greg Beilman: Why is this so? One is the time of transport is significantly increased For rural trauma care.

98

00:22:58.590 --> 00:23:16.630

Greg Beilman: Secondly, is, there is a significant risk of under triage, or underestimating the extent of injury or missing major injuries for patients injured in a rural environment for a number of reasons. And finally, there are a significant lack of resources

99

00:23:17.290 --> 00:23:28.469

Greg Beilman: in the back of an ambulance without blood, with the lowest trained person, taking care of this person for the first several hours after their injury

100

00:23:29.990 --> 00:23:47.890

Greg Beilman: and delay matters. This is work performed by one of my colleagues. Chris calling At a central health in Duluth, where she looked at her outcomes, at the Central Health over about 3 and a half years

101

00:23:47.890 --> 00:24:00.129

Greg Beilman: in rural trauma transfers. There were 1,887 patients transferred from these centers that you can see in this picture over the 3 and a half years of her study.

102

00:24:00.130 --> 00:24:27.519

Greg Beilman: with 398 femur fractures involved. During that study she noted that increased time to fracture. Fixation associated with increased time of transport was associated with increased length of stay, higher complication rates and decreased discharge to home for patients who are involved in a longer time to getting to surgical fixation of their femur fractures.

103

00:24:29.750 --> 00:24:47.889

Greg Beilman: And there is a lot of information in various areas about pre hospital care and prolonged transport or rural, and this is a summary of some of those papers. You can see that there have been 933 papers published

104

00:24:47.890 --> 00:24:58.899

Greg Beilman: 2 weeks ago, and thank you to Dr. Anna Sather, who is a resident working with me on this project, who did this background work.

105

00:24:58.900 --> 00:25:20.290

Greg Beilman: looking at airway and innovation. a lot of papers on blood products and Txa in the field, a lot of papers on decompression and or plural through our cost to me and many fewer papers on a lot of other areas that are making their way into daily care in the field.

106

00:25:21.750 --> 00:25:34.380

Greg Beilman: But there remain gaps in knowledge on outcomes. Aside from those things that I just talked about, and one of the gaps in knowledge is how pre hospital care affects

107

00:25:34.380 --> 00:26:02.460

Greg Beilman: admission outcomes after patients have actually showed up in the trauma hospital. There are a few states and regions that have linked pre hospital databases to Trauma Hospital outcomes, including Western Pennsylvania, California, Arizona, and manual work in Texas, in one small area in Texas, and then New South Wales and Alberta Canada.

108

00:26:02.980 --> 00:26:27.639

Greg Beilman: We have not yet done that in the State of Minnesota, where we have the Minnesota Emergency Medical Services Regulatory Board, which is focused on pre hospital care and the Minnesota Department of Health statewide trauma system, which is focused on trauma care. Once you reach the hospital but there's no

109

00:26:27.740 --> 00:26:38.899

Greg Beilman: currently overall system of care, looking at outcomes related to Pre hospital care and post hospital outcomes.

110

00:26:39.000 --> 00:26:41.740

Greg Beilman: Why does this matter for Minnesota.

111

00:26:42.180 --> 00:26:47.980

Greg Beilman: whether we believe it or not? In the Twin cities. Minnesota is a rural state.

112

00:26:48.030 --> 00:26:56.379

Greg Beilman: More than half the patients in the State of Minnesota live more than 30 min from a level. One or 2 trauma center.

113

00:26:56.460 --> 00:27:09.459

Greg Beilman: If you are in northern St. Louis County, the county that contains Duluth, you may be an hour and a half to 2 h from getting to a level. One or 2 trauma center down in Duluth.

114

00:27:09.550 --> 00:27:37.420

Greg Beilman: The majority of the ambulance facilities in in St. Louis County. Sit right down here, folks not up here where maybe some of those ambulance facilities could be effectively utilized for rural trauma care, and we have 7 frontier counties counties defined as less than 6 people per square mile in those counties in the State of Minnesota.

115

00:27:37.630 --> 00:27:54.259

Greg Beilman: So there are real opportunities for improved rural trauma care, and other similar types of care requiring urgent intervention throughout the State, including things like stroke care, or cardiac care.

116

00:27:57.300 --> 00:28:12.789

Greg Beilman: Some States have done a pretty good job at this, and this is one paper from a gentleman named Joshua Brown, at the University of Pittsburgh. And Joshua has been very interested in Ems care in

117

00:28:12.790 --> 00:28:27.860

Greg Beilman: Western Pennsylvania, over the last 10 years. This is one paper the Doctor Brown, Presented, published in the Journal of Trauma in 2019, where Doctor Brown used Geo.

118

00:28:27.870 --> 00:28:39.589

Greg Beilman: positioning to look at ground and air based emergency medical services for the State of Pennsylvania, and he used geocoding of

119

00:28:39.600 --> 00:28:44.099

Greg Beilman: these services and trauma center locations

120

00:28:44.150 --> 00:29:14.130

Greg Beilman: looked at ground and a Us. Basis link that to age adjusted transportation, injury, fatality rates for 6 years that he obtained for each county and then calculated county level injury, severity score and pre hospital time, using individual patient data that they were able to obtain from the Pennsylvania State Trauma Registry. This is not currently possible for us in the State of Minnesota.

121

00:29:14.510 --> 00:29:38.409

Greg Beilman: and the question he was asking is, Where do we put our pre hospital emergency services, and he took that data by county mapped against where they had services especially related to pre hospital services and came up with something he called the Geographic Ems Index.

122

00:29:38.410 --> 00:29:56.980

Greg Beilman: that was related to age adjusted injury, county fatality, rate per 100,000 population across the State of Pennsylvania. The higher the geographic Ems in index was, the more likely you were to survive a

123

00:29:57.920 --> 00:30:10.370

Greg Beilman: I I want to get this right a transportation related motor vehicle accident reli resulting in trauma

124

00:30:10.950 --> 00:30:28.209

Greg Beilman: in this map the hospital is a blue symbol. A helicopter is a black gold star ground. Ems is a pink dot. The size of each of these is is related to the number of ambulances that they use.

125

00:30:28.630 --> 00:30:41.949

Greg Beilman: He then took the county that had the highest age adjusted transportation mortality rate, which was Elk County here, and they ended up reciting a helicopter base

126

00:30:41.950 --> 00:31:01.819

Greg Beilman: based on this Gmc. Or geographical Ems Index, which resulted in a significant decrease in age, adjusted mortality rate for out county by 20% over the period of their study.

127

00:31:03.010 --> 00:31:07.099

Greg Beilman: We can do this folks in the State of Minnesota.

128

00:31:09.030 --> 00:31:36.089

Greg Beilman: and that brings me to the work that we've started about a year and a half ago we have a very young center called the University of Minnesota Translational Center for Associative trauma care. The vision of our center is create a multidisciplinary translational research center that brings together trauma and emergency care research across the State of Minnesota into a a single entity to inform better care for our patients.

129

00:31:36.710 --> 00:32:02.199

Greg Beilman: I am a trauma surgeon. I love to operate. I love taking care of sick people, but if you look at where you can make a difference, it's not once they reach the hospital. If you are reach the hospital alive you have a 90 plus percent chance of leaving the hospital alive where the the biggest bang for our buck is continues to be in pre hospital care. And so we are focusing our efforts

130

00:32:02.200 --> 00:32:16.100

Greg Beilman: on point of injury care through early pre hospital trauma care, and in our state rural trauma care, as it is an important piece of this work.

131

00:32:17.800 --> 00:32:43.960

Greg Beilman: And as I just talked about using the example of Pennsylvania. One of the goals of our of our center is to get an idea of what's going on with pre hospital care in the State of Minnesota, and how that might change the outcomes for people in our State if we understand where the gaps in care are, and we're working with the State of Minnesota. We are working with

132

00:32:43.960 --> 00:32:56.309

Greg Beilman: level one and 2 trauma centers in the State of Minnesota, and we're working with some national database organizations to start to get at identifying those gaps in care.

133

00:32:57.740 --> 00:33:07.659

Greg Beilman: I want to talk about some other specific areas for up and opportunities in the next couple of minutes before I conclude my talk.

134

00:33:08.550 --> 00:33:27.049

Greg Beilman: One of those opportunities is in monitoring, and there are a number of operate opportunities that include monitoring for development of shock and endpoints for the entire career. for me as an intensivist, I've been trying to to come up with a

135

00:33:27.490 --> 00:33:48.820

Greg Beilman: an endpoint better than lactate for monitoring shock. we continue to work on this. We continue to try to understand how to better bring it to the patient bedside. also important for pre hospital care, especially in the military environment, is monitoring for development of organ failure.

136

00:33:48.820 --> 00:34:11.039

Greg Beilman: And then there are importantly in the field are monitoring for development of issues requiring intervention especially related, is infection and sepsis. There are a number of new, very

interesting, and I think innovative approaches to both neuro monitoring and closed-loop monitoring of pain management.

137

00:34:11.040 --> 00:34:21.350

Greg Beilman: in other words, for pain poking up a device that allows you to monitor the patient's pain have that hooked into a

138

00:34:21.350 --> 00:34:42.460

Greg Beilman: a narcotic delivery system that titrates pain. Therapy based on the needs of the patient doesn't over sedate them doesn't stop breathing and those kind of things, just like the diabetes systems that many of us are familiar with are within a couple of years of being brought to the patient bedside.

139

00:34:43.639 --> 00:34:59.520

Greg Beilman: Another thing that I think is very interesting with monitors is the whole concept of an integrated, wearable system. that allows us to monitor what's going on with our patients during transport during early care.

140

00:34:59.520 --> 00:35:20.629

Greg Beilman: That 10 years ago to me, seemed like science Fiction. Thanks to honestly both the military and to a a lot of sports systems is now becoming something that is used on a daily basis, and gives us the opportunity for monitoring a number of things moving forward

141

00:35:21.690 --> 00:35:46.679

Greg Beilman: in our laboratory. We have been spending about the last 10 years identifying biomarkers of the development of shock, the development of in or the need for intervention in shock and the risk for mortality. And this is one of those biomarkers that we have identified coming out of our work in Iraq and Afghanistan and showing that it's better than lactate

142

00:35:46.850 --> 00:36:00.849

Greg Beilman: in our studies of both humans in civilian trauma. And this is people suffering a combat casualty, injury. In Afghanistan and Iraq

143

00:36:02.550 --> 00:36:09.979

Greg Beilman: an important care intervention is in the care of wounds, especially in the field.

144

00:36:10.110 --> 00:36:30.459

Greg Beilman: 25 years ago, when I was first deployed. What we would do for many of these people is put a wet to dry dressing on them, wrap them up with a curlex and and a splint and then put them in the helicopter and send them back to the next echelon of care.

145

00:36:30.680 --> 00:36:43.040

Greg Beilman: By the time they arrived there the wound would be stinking You couldn't see what was going on, because it was covered up the splint would be too tight, and the patient would have a cold foot

146

00:36:43.040 --> 00:37:01.539

Greg Beilman: and they'd be developing all sorts of problems. You can see with my hand on this external fix, that or device, we've solved one of those problems with the splint and the back dressing as a huge advance for us in doing wound care for patients moving forward as well

147

00:37:02.880 --> 00:37:23.999

Greg Beilman: back dressings have a number of proven benefits, including fewer dressing changes, fewer skin problems, easier nursing care, improved drainage management a hundred authors have published studies showing a number of benefits to using one back care.

148

00:37:24.000 --> 00:37:41.319

Greg Beilman: One of the interesting opportunities moving forward would be, can you connect back dressings to other things to detect the development of infection in the effluent that's coming out of that dressing. Can you identify ways

149

00:37:41.320 --> 00:38:03.789

Greg Beilman: locally to mix in an anti-microbial wound dressing that decreases the risk of wound infection in these patients, and so on. And there are a number of active studies ongoing. to understand how we adapt a negative pressure wound therapy to those kind of needs.

150

00:38:05.330 --> 00:38:15.939

Greg Beilman: I've already alluded to the fact that medics on the civilian and the military side are our have

151

00:38:16.070 --> 00:38:33.710

Greg Beilman: training that I think could be optimized. and then the balance of that training is, how long do you have to train these young men and women who are are taking care of our patients in the field? I, I've already mentioned the civilian plan, which is

152

00:38:33.710 --> 00:38:54.829

Greg Beilman: 6 weeks of online training, 2 weeks of in-person training that's very similar to what a combat medic coming out of basic training gets which last time I looked at it was a 14 week. a period of training before that combat medic is turned loose to take care of patients.

153

00:38:54.880 --> 00:39:00.869

Greg Beilman: How do we help these patients triage initial? And how do we help these medics

154

00:39:01.140 --> 00:39:16.239



Greg Beilman: care for patients by triaging initial injuries? How do we help them learn to provide the best field care for prolonged in prolonged settings, including those things that I talked about in in previous slides.

155

00:39:17.980 --> 00:39:40.790

Greg Beilman: One of the big gaps in care continues to be medic resources. You have this young man or woman who is doing their darned as to care for these patients. These are some of the most enthusiastic caring wonderful intervention in individuals that I've ever had my the pleasure of working with.

156

00:39:40.820 --> 00:40:09.470

Greg Beilman: how do we give these kids the tools to really do a good job in caring for patients. One of the big gaps is in documentation. Another is communication. Right now, you know if you're in a frontier county in Minnesota, you may not have a cell phone signal for an hour and a half while you're driving to do, lose, or Saint Cloud.

157

00:40:09.630 --> 00:40:27.190

Greg Beilman: are there other ways we can communicate using AI or other tools. How do we best identify the effective way to move patients. And how do we deliver appropriate and not deliver in appropriate and route care for our patients?

158

00:40:28.730 --> 00:40:45.819

Greg Beilman: this is one example of battlefield documentation that do is something. The 7 11 air wing came up with where they developed a point of injury software tool that works on an android smartphone that works with

159

00:40:45.870 --> 00:41:03.389

Greg Beilman: oral communication to help the medic document effectively and reduce cognitive workload. This has been associated with improved documentation and collaboration and secure data transfer similar to what we would need on the civilian side.

160

00:41:03.390 --> 00:41:22.739

Greg Beilman: we, there is active work going on to try to figure out how to use a similar tool in the civilian setting, and one of my goals is to identify Pilot opportunities for us in the State of Minnesota to use something like that do for care of our patients?

161

00:41:23.180 --> 00:41:36.829

Greg Beilman: It it has a number of capabilities, and these are listed here, and those are available. If you type in bat, Doc. to your search engine. this information will come up.

162

00:41:38.230 --> 00:41:56.509

Greg Beilman: I'm going to finish in the next couple of minutes by talking about the Uniform Services University, Minnesota, funding opportunity that was initiated last year in 2,023, 2,022 and is now moving forward in 2,023

163

00:41:56.580 --> 00:42:17.779

Greg Beilman: The purpose of this opportunity is to support research projects, to address health care issues in the Department of Defense in partnership with investigators at the In. In Minnesota. The proposed research must include a partner at the Uniform Services University, which is the Dods

164

00:42:17.940 --> 00:42:28.999

Greg Beilman: Medical School, and it must be focused on topics and focus areas in the funding announcements that are getting at the health care requirements of the Dod.

165

00:42:29.980 --> 00:42:52.949

Greg Beilman: We are very interested in proposed in this research to include cross organizational collaborations with fair view health services and medical alley, and including trainees. The schedule for this year for the 30 million dollars or so in funding We are hoping to see the funding announcement come out in July of 2,023,

166

00:42:52.950 --> 00:43:14.759

Greg Beilman: with a full application do. At the end of September of 2,023, Peer Review, completed by December 2,023, and award notification in February of 2,024. Last year we awarded 13 grants between uniform Services University and the University of Minnesota. That included

167

00:43:15.150 --> 00:43:27.929

Greg Beilman: 31 million dollars in funding. Again this year. We're looking at about the same level of funding, and we're hoping to a award the same amount of grants moving forward.

168

00:43:28.120 --> 00:43:37.359

Greg Beilman: The other thing I would want to throw out there for your Interest in consideration is this consortium called M. Tech.

169

00:43:37.360 --> 00:44:00.069

Greg Beilman: Medical Technology enterprise consortium the University of Minnesota is a member of this consortium This is a nonprofit consortium funded by the Dod designed to promote development and delivery of innovative medical technologies, to improve health and safety of military personnel, veterans and civilians.

170

00:44:00.220 --> 00:44:07.640

Greg Beilman: Their projects can range from pilot projects for 50 grand to up to 25 million dollars in size.

171

00:44:07.730 --> 00:44:18.069

Greg Beilman: This is funded through M. Tech by the Dod via a mechanism called other transaction agreements.

172

00:44:18.170 --> 00:44:46.570

Greg Beilman: it's a little tricky, but I can help, or Joe Constant can help you navigate the M. Tech project issues. If you come up with an M. Tech project to think that you think you are able to submit a relevant grant on If you have interest in either one of these 2 opportunities, please reach out to me through my email, my last name, Bielman at Edu.

173

00:44:48.400 --> 00:45:04.920

Greg Beilman: Thank. I want to thank again. the you folks for your attention, Dr. Nunez and Dr. Hogwist for the chance to talk to you folks today. and the office of diversity, equity, and inclusion for the opportunity to speak.

174

00:45:04.990 --> 00:45:10.759

Greg Beilman: We have made significant advances in trauma care over the years of the global war on terrorism.

175

00:45:10.800 --> 00:45:32.120

Greg Beilman: The next war we'll have a number of challenges related to the fact that we are likely to be fighting a war in a distributed peer to peer environment with lack of air, superiority. There are many similarities between combat, casualty, care, and rural trauma care in the State of Minnesota, and there will be

176

00:45:32.120 --> 00:45:43.180

Greg Beilman: necessary a number of major adaptations in prolonged, casually care, both in combat, casually care and in the State of Minnesota.

177

00:45:43.740 --> 00:46:03.530

Greg Beilman: Thank you, folks, for the opportunity to to present. Today. I look forward to your questions and please forgive any miss speaking that I may have had related to the fact that I'm talking without the benefit of a in person. Audience.

178

00:46:06.220 --> 00:46:20.390

Kris Hogquist: Great! Thank you so much. That was a terrific talk, and so much to think about. Folks put your questions in the Q. A. For Dr. Bielmann. And while people are putting their questions in there, Greg. I'd like to start out. I

179

00:46:20.680 --> 00:46:38.880

Kris Hogquist: your presentation, got me thinking about what are the challenges of having pre hospital care in rural settings when they would then be underutilized if we had pre hospital care at the end of the gun flint trail, for example. can. How do we keep personnel trained and ready.

180

00:46:40.320 --> 00:46:46.270

Greg Beilman: great question. And I I think, a multi-layered answer.

181

00:46:46.290 --> 00:46:54.930

Greg Beilman: First layer is Right now we have a fairly Balkanized approach to pre hospital care in the State of Minnesota.

182

00:46:54.970 --> 00:47:09.350

Greg Beilman: and that's evidenced by the membership on the Emsrb. the States Ems Regulatory Board.

183

00:47:09.470 --> 00:47:19.799

Greg Beilman: is there a way that we can thoughtfully agree that there are going to be settings where there will be a low

184

00:47:19.860 --> 00:47:27.270

Greg Beilman: utilization of the resource of pre hospital care. How do we supplement the

185

00:47:27.330 --> 00:47:36.470

Greg Beilman: revenue to support that effort? And then how do we keep people trained? And I think it's pretty easy to

186

00:47:36.500 --> 00:47:49.519

Greg Beilman: rotate ems providers to rotate, you know, on the military sorry side, to rotate er providers or trauma surgeons in and out of high volume settings

187

00:47:49.520 --> 00:48:07.249

Greg Beilman: in the military. What they've done is they've taken trauma surgeons who during peacetime on the military, do not have a lot to do, and they put them into civilian trauma centers and keep them up to date by practicing trauma care at shock trauma.

188

00:48:07.250 --> 00:48:25.290

Greg Beilman: or regions, or other or St. Louis University, or other high volume. Civilian trauma centers. We could do exactly the same thing for Ems providers in the field, and we could do it either internally by rotating them from

189

00:48:25.380 --> 00:48:36.429

Greg Beilman: from the boundary waters for 3 months, and then down to Duluth for 3 months, and all you'd have to do is say we need to do something like this and figure out how to pay for it.

190

00:48:36.760 --> 00:48:41.599

Greg Beilman: A great question. I hope to be involved in some of those discussions.

191

00:48:42.190 --> 00:48:54.190

Kris Hogquist: Great. Okay. We have a question from David Hamler. Greg, how can a systems approach, help our urban response and possible prevention of M. And M. Say, here in Metro, twin cities.

192

00:48:55.160 --> 00:49:08.799

Greg Beilman: M. And M is morbidity and mortality. So how do you come up with a systems? Approach to delivering better trauma care?

193

00:49:09.260 --> 00:49:21.409

Greg Beilman: I I think it's much easier in a urban setting than it is in a rural setting. If you look at our transport time from calling Ems to the time that the patient arrives at a trauma center

194

00:49:21.840 --> 00:49:28.390

Greg Beilman: in the Twin Cities. It's 13 min. Okay, so very different than in a rural setting.

195

00:49:28.400 --> 00:49:43.700

Greg Beilman: and I think that there is a pretty good internal morbidity and mortality feedback within the trauma centers in the in the twin cities, at least.

196

00:49:43.700 --> 00:50:04.809

Greg Beilman: So there's a lot of feedback between North memorial regions, and the and the other trauma centers, for instance, at the regional trauma. It's an our tech regional trauma, something centers for the for Central Minnesota.

197

00:50:04.920 --> 00:50:10.290

Greg Beilman: that's less well developed in some of our urban or our rural areas.

198

00:50:11.040 --> 00:50:15.060

Greg Beilman: Thank you for that question, David, and thank you for your service

199

00:50:16.050 --> 00:50:28.399

Kris Hogquist: another question from David. There are organizations such as Summit Academy, which traditionally chain train. Excuse me, plumbers, electricians. and other trades. How can we enable them to train medics

200

00:50:30.540 --> 00:50:35.409

Greg Beilman: another great question. And something that I touched on

201

00:50:35.500 --> 00:50:54.079

Greg Beilman: the balance is, gonna be you get somebody for a very reasonable hourly wage. If all they've had to do is take 6 week online course, pay for that, take a 2 week in person course, pay for that, and then pay for taking a

202

00:50:54.270 --> 00:50:59.940

Greg Beilman: a basic accreditation. the more you add to the courses, the more

203

00:50:59.990 --> 00:51:13.249

Greg Beilman: skill sets you add, the more cost goes into that. The more cost you and I are going to pay to employ an er driver or so on, and some of this, I think, comes from

204

00:51:13.290 --> 00:51:24.139

Greg Beilman: our regional or state regulatory environment. But if you are in one of our front here. counties in the State of Minnesota.

205

00:51:24.660 --> 00:51:49.460

Greg Beilman: can you afford to have a full time. Ems system. Many of those counties have a volunteer system with very basic train medics. And so there's that balance I would like to push for adding some of the things I touched on in this discussion for Emts in all of those settings.

206

00:51:49.460 --> 00:52:11.460

Greg Beilman: I also think that there's an opportunity. This is Greg Beilman talking, not University, Minnesota. Okay, there are opportunities for us to support training from the State or other regional areas for medics, especially in our frontier and rural environments, and I hope I answered your question. Date

207

00:52:12.670 --> 00:52:20.249

Kris Hogquist: question from Joanna Perrier. Have there been times when you've had to improvise versus follow protocol when in combat.

208

00:52:21.920 --> 00:52:24.840

Greg Beilman: I think,

209

00:52:26.510 --> 00:52:40.050

Greg Beilman: one of the one of the gratifying bits of working in a field hospital combat sport hospital or forward surgical team was the need to

210

00:52:40.540 --> 00:52:54.130

Greg Beilman: improvise based on the equipment and resources that I had with me to help somebody survive. And and what I really appreciated was the fact that

211

00:52:54.210 --> 00:52:55.570

Greg Beilman: if you have

212

00:52:55.820 --> 00:53:24.180

Greg Beilman: somebody who's willing to figure out how to make something work, if you have partners, nurses, techs, others who are working with you. You are able to save most people, and you know. So I drained abscesses. I did surgery. I did vascular repairs. I did other things with the resources I had present. and saved kids lives that, you know, using stuff that that

213

00:53:24.740 --> 00:53:31.989

Greg Beilman: pre deployment. I would have said, I can't do this with that. And so it really helped drive my

214

00:53:32.010 --> 00:53:46.429

Greg Beilman: ability, I think, as a surgeon, to effectively care for my patients. It also helped me realize you. We really don't need all the stuff that my surgeons thought we needed to do many of the things we do.

215

00:53:47.810 --> 00:54:07.509

Kris Hogquist: Yeah, it's about the people and working together this. Another question relating to this is from Amy Grammer. I really am appreciating the application to rural communities in particular. Can you speak more about how you're engaging those community members in this research. How are their perceptions and reality on the ground being considered an integrated?

216

00:54:08.140 --> 00:54:27.639

Greg Beilman: And first, please, if you have ideas, please email me, I'd love to talk Beielman at Edu. we are working on identifying gaps in rural ems. Care by pulling together a group of Ems providers

217

00:54:27.640 --> 00:54:52.409

Greg Beilman: that is geographically diverse and doesn't just include, you know, the people that are easy for me to get to the people that work at North memorial ems, and so on. But getting the Ems providers that are in some of these rural communities. We are going out to Saint Cloud to dilute to other locations to talk to providers

218

00:54:52.410 --> 00:55:15.310

Greg Beilman: in those locations. I would love to get to the point where we're also visiting people throughout the State of Minnesota. But I would. We're only into this a year. I would welcome your help and feedback, and making sure that we are appropriately identifying and representing the needs of our State and the people of our State.

219

00:55:18.370 --> 00:55:21.980

Kris Hogquist: Thank you. A question from Les Drews.

220

00:55:22.000 --> 00:55:31.150

Kris Hogquist: It's great to improve survival and cardiovascular health. But do you think there's an opportunity for addressing and improving neurological brain function?

221

00:55:31.750 --> 00:55:45.670

Greg Beilman: And so first, I put my email in the chat hopefully to everybody. secondly, Les, thank you for that question. I think trauma is a great model for

222

00:55:45.700 --> 00:55:49.490

Greg Beilman: other patient conditions that

223

00:55:49.950 --> 00:55:58.330

Greg Beilman: are very significantly affected by duration of time until their first treatment, and that includes neurologic

224

00:55:58.390 --> 00:56:09.290

Greg Beilman: injury, not just trauma to the head, but stroke is in particular and cardiac injury. So both of the both of those are

225

00:56:09.320 --> 00:56:13.700

Greg Beilman: very relevant models as well. Thank you.

226

00:56:16.750 --> 00:56:27.330

Kris Hogquist: Another question from David Hamlet or a comment. Greg's lab has been instrumental in facilitating diversity and research that often leads to doctorates, med school admissions, etc. Thank you.

227

00:56:29.030 --> 00:56:32.739

Greg Beilman: I've I've had the pleasure in honor of

228

00:56:33.050 --> 00:56:46.420

Greg Beilman: working with medical students, other students, graduate students from multiple campuses. over the years, all of whom are way smarter and more energetic than I am.

229

00:56:48.330 --> 00:56:50.679

Kris Hogquist: Your impact is appreciated. Greg.

230

00:56:50.970 --> 00:56:59.300

Kris Hogquist: okay, one last question. You've touched on this a bit, but I'm going to read the question again just to see if there's anything more you want to?

231

00:56:59.740 --> 00:57:08.719

Kris Hogquist: talk about about this? How can community engagement and increasing lay local knowledge about basic pre hospital care complement your efforts.

232

00:57:09.400 --> 00:57:17.359

Greg Beilman: And and I kind of touched on that before, please, if you have ideas, email, me, because we are

233



00:57:17.540 --> 00:57:31.599

Greg Beilman: what we're really after is identifying gaps in care that we can help understand better through research and then go back and do better training. I know that

234

00:57:31.840 --> 00:57:44.879

Greg Beilman: in the Twin Cities. I'm not touching what's going on in Kucha Chain County or St. Louis County, and I need the feedback of my partners up there. The other thing I didn't mention is.

235

00:57:44.990 --> 00:58:07.439

Greg Beilman: the first responders ain't medically trained at all. So it's the the policeman, the the the bystanders driving by on the road, others that need better tools. at that. That are an opportunity for us as well, and understanding how

236

00:58:07.860 --> 00:58:13.319

Greg Beilman: involvement of our first responders changes, outcomes, is important to

237

00:58:13.620 --> 00:58:17.249

Greg Beilman: and again. Happy to happy to talk and learn more.

238

00:58:20.160 --> 00:58:27.570

Kris Hogquist: Okay, 1. One last question came in, and we have time. Have you incorporated Telemedicine into your outreach and follow up

239

00:58:27.890 --> 00:58:44.359

Greg Beilman: great great question. One of the areas I didn't touch much on is telemedicine. I think there are real opportunities for better telemedicine during initial stabilization and transport. if you have decent bandwidth.

240

00:58:44.360 --> 00:59:06.749

Greg Beilman: And this is where AI may come into play. If you can train an AI to do straightforward interventions in the field. this may be an opportunity for our Ems providers, or for our first responders to get better care. telemedicine, I think, is fascinating because

241

00:59:06.770 --> 00:59:22.310

Greg Beilman: you have an Ems Provider taking care of the patient. You have the potential to hook that emails provider up with an er doctor who can give them real time feedback about what's working and what's not working. And I think.

242

00:59:22.410 --> 00:59:29.359

Greg Beilman: again, given bandwidth. That may be one of the opportunities that we have in the State of Minnesota great question.

243

00:59:30.790 --> 00:59:43.999

Kris Hogquist: and Benjamin Wills asks you mentioned military physicians up and integrate with local health care systems to keep up their skills. Perhaps the mission of the National Guard to the State could allow training together and knowledge sharing with rural communities

244

00:59:45.620 --> 00:59:51.670

Greg Beilman: a great possibility. And I would love to learn and discuss that more

245

00:59:55.540 --> 01:00:06.120

Kris Hogquist: wonderful. Well, we are at time. Dr. Biemann. Thank you so much. Your top generated a lot of interest. And thank you for all your efforts.

246

01:00:06.150 --> 01:00:13.689

Kris Hogquist: to our audience. So one question survey will appear in your web, Browser, immediately after ending the zoom session.

247

01:00:13.780 --> 01:00:28.789

Kris Hogquist: So please take time to complete the survey, to inform us of future presentation topics. reminder that this session was recorded, and will be shared within 2 days to all those who registered for the event. and is also available on the Odei website.

248

01:00:29.010 --> 01:00:35.319

Kris Hogquist: lastly, save the date. The next Dean's lecture series. Session will be on July twelfth.

249

01:00:36.660 --> 01:00:38.369

Kris Hogquist: Thank you, and goodbye.