WEBVTT

1 00:00:00.060 --> 00:00:02.670 <v Presenter>Okay, there we go. Okay.</v>

2 00:00:02.670 --> 00:00:03.503 All right.

3 00:00:03.503 --> 00:00:05.430 And this is where I wanted to start talking right here.

4 00:00:05.430 --> 00:00:07.849 So, to put...

5 00:00:07.849 --> 00:00:11.880 To put implementation science in sort of the context

6 00:00:11.880 --> 00:00:15.234 of the whole kind of public health scientific

7 00:00:15.234 --> 00:00:20.234 research pipeline, we think about efficacy trials,

8 00:00:21.420 --> 00:00:25.470 effectiveness, pragmatic and cost-effectiveness trials,

9 00:00:25.470 --> 00:00:29.310 implementation studies and dissemination studies.

10 00:00:29.310 --> 00:00:33.210 So things don't always work this way,

11 00:00:33.210 --> 00:00:36.689 but this is the idealized sort of research pipeline.

12 00:00:36.689 --> 00:00:40.080 And in efficacy trials,

13 00:00:40.080 --> 00:00:42.990 what happens is they're usually kind of phase

14 00:00:42.990 --> 00:00:46.139 three individually randomized clinical trials

15 00:00:46.139 --> 00:00:49.740 of investigational drugs and devices.

16 00:00:49.740 --> 00:00:54.690 And they're usually done in very relatively high budget

17 00:00:54.690 --> 00:00:57.690 research settings with lots of exclusion

18 00:00:57.690 --> 00:01:01.560 criteria and academic researchers and so forth.

19 00:01:01.560 --> 00:01:04.590 And they established the biological efficacy

20 00:01:04.590 --> 00:01:07.860 of a particular drug or device.

21 00:01:07.860 --> 00:01:10.553 Should that be found efficacious,

22 00:01:10.553 --> 00:01:13.230 then we might move on to

23 00:01:13.230 --> 00:01:16.080 what's now called an effectiveness trial,

24 00:01:16.080 --> 00:01:18.870 an often a somewhat synonym

25 00:01:18.870 --> 00:01:23.100 is a pragmatic trial and sometimes cost-effectiveness,

26 00:01:23.100 --> 00:01:25.830 it is also studied at the same time,

27 00:01:25.830 --> 00:01:28.837 and in effectiveness trials we might take that same

28 00:01:28.837 --> 00:01:31.680 drug and device, but now we're kind of interested

29 00:01:31.680 --> 00:01:34.650 in how well it works at the community level.

30 00:01:34.650 --> 00:01:37.800 So oftentimes effectiveness trials and pragmatic

31 00:01:37.800 --> 00:01:42.510 trials are cluster-randomized, say, by providers,

32 00:01:42.510 --> 00:01:47.510 provider practices, clinics or facilities, villages,

33 00:01:48.780 --> 00:01:53.780 neighborhoods and so forth, and on the exclusion criteria,

34 00:01:54.090 --> 00:01:57.690 it's encouraged that they be as minimal as possible

35 00:01:57.690 --> 00:02:00.300 to exclude as many people who might be eligible

36 00:02:00.300 --> 00:02:02.640 for this treatment should it be shown to be

37 00:02:02.640 --> 00:02:04.950 effective and cost-effective.

38 00:02:04.950 --> 00:02:08.190 And they tend to be larger and maybe run

39 00:02:08.190 --> 00:02:10.260 for a longer amount of time.

40 00:02:10.260 --> 00:02:13.710 And then cost may be taken into account as well.

41 00:02:13.710 --> 00:02:16.433 Then should a particular intervention,

42 00:02:16.433 --> 00:02:19.366 now I've moved from the word drug or device

43 00:02:19.366 --> 00:02:24.105 to intervention because oftentimes a drug or device may

44 00:02:24.105 --> 00:02:27.270 be embedded within a much more complex program

45 00:02:27.270 --> 00:02:29.640 at the effectiveness stage,

46 00:02:29.640 --> 00:02:32.610 where we'd be looking at not just sort

47 00:02:32.610 --> 00:02:34.980 of biological impact or health impact,

48 00:02:34.980 --> 00:02:38.133 but also it's how well it can be delivered.

49 00:02:39.930 --> 00:02:41.451 In this classic pipeline,

50 00:02:41.451 --> 00:02:45.660 should a programmer intervention be shown to be

51 00:02:45.660 --> 00:02:47.910 effective and cost-effective, then we move,

52 00:02:47.910 --> 00:02:50.910 might move on to an implementation study.

53 00:02:50.910 --> 00:02:54.365 And there we might be taking the program that was

54 00:02:54.365 --> 00:02:56.190 the multi-level program

55 00:02:56.190 --> 00:02:58.823 that may have been shown to be effective

56 00:02:58.823 --> 00:03:02.709 and cost-effective at this second level of research

57 00:03:02.709 --> 00:03:07.224 and be adapting it contextually, tweaking, adapting,

58 00:03:07.224 --> 00:03:12.150 modifying the program for new contexts such as

59 00:03:12.150 --> 00:03:15.540 from one country to another, from urban to rural, from,

60 00:03:15.540 --> 00:03:16.980 say, in the United States,

61 00:03:16.980 --> 00:03:20.100 from the North to the South and so forth.

62 00:03:20.100 --> 00:03:23.520 And then also experimenting potentially

63 00:03:23.520 --> 00:03:27.930 with cost-effective ways of implementing it to kind

64 00:03:27.930 --> 00:03:29.820 of streamline the delivery.

65 00:03:29.820 --> 00:03:31.720 Also at the implementation phase,

66 00:03:31.720 --> 00:03:35.198 we'd be looking at scale up and scale out,

67 00:03:35.198 --> 00:03:39.000 and these things could be done without,

68 00:03:39.000 --> 00:03:42.060 with primary endpoints not even being health outcomes

69 00:03:42.060 --> 00:03:43.050 at this point.

70 00:03:43.050 --> 00:03:45.737 They might purely be things such as adoption,

71 00:03:45.737 --> 00:03:48.330 reach and so forth.

72 00:03:48.330 --> 00:03:51.900 And then finally in the last stage, dissemination,

73 00:03:51.900 --> 00:03:54.480 that's all again about the scale up stage,

74 00:03:54.480 --> 00:03:58.354 the scale up meaning making it more available

75 00:03:58.354 --> 00:04:01.860 in the particular context that was studied,

76 00:04:01.860 --> 00:04:04.406 but to everybody within that context and everybody

77 00:04:04.406 --> 00:04:06.840 like those who were in that context.

78 00:04:06.840 --> 00:04:11.840 And then scale out meaning to everybody, to other places.

79 00:04:12.480 --> 00:04:14.130 And again, there could be further

80 00:04:16.120 --> 00:04:18.153 adaption needed at that point.

81 00:04:23.070 --> 00:04:26.130 Okay, so what is implementation science?

82 00:04:26.130 --> 00:04:29.036 A number of definitions have been posed.

83 00:04:29.036 --> 00:04:32.050 And maybe the one at the bottom is the simplest

84 00:04:32.050 --> 00:04:35.520 and maybe one that I prefer the best,

85 00:04:35.520 --> 00:04:38.940 implementation science is about determining what works

86 00:04:38.940 --> 00:04:41.433 in real-life, full-scale settings.

87 00:04:42.570 --> 00:04:46.830 It can also, say, the blue boxed definition of systematic,

88 00:04:46.830 --> 00:04:49.860 scientific approach to ask and answer questions

89 00:04:49.860 --> 00:04:51.780 about how to get what works

90 00:04:51.780 --> 00:04:55.052 to people who need it with greater speed, fidelity,

91 00:04:55.052 --> 00:04:59.013 efficiency, quality and relevant coverage.

92 00:05:00.210 --> 00:05:02.693 And then the middle definition I think is the one

93 00:05:02.693 --> 00:05:06.810 that's used by the NIH in the dissemination

94 00:05:06.810 --> 00:05:09.000 and implementation science study section

95 00:05:09.000 --> 00:05:12.510 that's recently been closed down

96 00:05:12.510 --> 00:05:17.510 and Bree issued in with some greater specializations,

97 00:05:20.100 --> 00:05:21.690 that that's been defined,

98 00:05:21.690 --> 00:05:23.520 implementation and prevention science

99 00:05:23.520 --> 00:05:26.520 there that was defined as the scientific study

100 00:05:26.520 --> 00:05:29.070 of programs and interventions which promote

101 00:05:29.070 --> 00:05:32.550 the systematic uptake of clinical research findings,

102 00:05:32.550 --> 00:05:35.610 so here it's hearkening to the pipeline I was

103 00:05:35.610 --> 00:05:38.940 just discussing, and other evidence-based approaches

104 00:05:38.940 --> 00:05:42.540 into routine clinical practice and public health policy,

105 00:05:42.540 --> 00:05:45.450 hence improving the quality, effectiveness,

106 00:05:45.450 --> 00:05:48.420 reliability, safety, appropriateness, equity,

107 00:05:48.420 --> 00:05:51.150 efficiency of healthcare.

108 00:05:51.150 --> 00:05:53.100 So hopefully that gives you some sense

109 00:05:53.100 --> 00:05:54.960 of what we're talking about here.

110 00:05:54.960 --> 00:05:59.040 It's not that there's a single uniform definition

111 00:05:59.040 --> 00:06:02.580 that's kind of universally agreed on by everybody,

112 00:06:02.580 --> 00:06:06.780 but it's definitely getting at not so much showing

113 00:06:06.780 --> 00:06:11.780 that interventions, programs and so forth

114 00:06:12.330 --> 00:06:15.210 are effective because that's already been done

115 00:06:15.210 --> 00:06:18.570 in these pragmatic and effectiveness trials,

116 00:06:18.570 --> 00:06:23.430 but at getting them to the largest populations possible

117 00:06:23.430 --> 00:06:25.710 in an efficient way in making sure

118 00:06:25.710 --> 00:06:27.960 that quality is maintained.

119 00:06:27.960 --> 00:06:31.293 So very practical, but also very challenging.

120 00:06:32.340 --> 00:06:35.460 So another piece of this in implementation science,

121 00:06:35.460 --> 00:06:38.580 since we're studying evidence-based interventions

122 00:06:38.580 --> 00:06:41.490 is that implementation science studies,

123 00:06:41.490 --> 00:06:45.750 we call it the three Rs, Rigorous, Rapid and Relevant.

124 00:06:45.750 --> 00:06:48.210 So rigorous has to do with,

125 00:06:48.210 --> 00:06:51.161 even though we're studying very practical things,

126 00:06:51.161 --> 00:06:55.290 like implementation science in some ways is, you know,

127 00:06:55.290 --> 00:06:57.900 the outgrowth of what had been previously called

128 00:06:57.900 --> 00:07:00.930 program evaluation, that we might,

129 00:07:00.930 --> 00:07:03.360 we still wanna use state-of-the-art methods.

130 00:07:03.360 --> 00:07:05.063 The studies use, you know,

131 00:07:05.063 --> 00:07:10.063 formal power calculations for cluster-randomized designs.

132 00:07:10.534 --> 00:07:14.501 They can take into account multiple outcomes

133 00:07:14.501 --> 00:07:18.771 and the methodologies can use causal inference methods

134 00:07:18.771 --> 00:07:23.771 and all sorts of multi-level analysis methods and so forth.

135 00:07:24.810 --> 00:07:27.890 There's no drop off in the rigor

136 00:07:27.890 --> 00:07:30.690 in implementation science, necessarily.

137 00:07:30.690 --> 00:07:33.336 And in fact it's very challenging to be rigorous

138 00:07:33.336 --> 00:07:36.000 in these kinds of settings where the data may,

139 00:07:36.000 --> 00:07:40.770 are imperfect so when we get onto rapid,

140 00:07:40.770 --> 00:07:42.900 we also need to get these answers very quickly

141 00:07:42.900 --> 00:07:45.150 'cause we're talking about urgent public health

142 00:07:45.150 --> 00:07:48.556 questions and we want to have our implementation

143 00:07:48.556 --> 00:07:53.556 science work be informative to policy development

144 00:07:53.670 --> 00:07:58.670 and formulation and promulgation, not coming afterwards.

145 00:07:59.220 --> 00:08:01.020 So in order to be rapid,

146 00:08:01.020 --> 00:08:03.616 we wanna make use of existing data,

147 00:08:03.616 --> 00:08:08.092 electronic health records, other sorts of records

148 00:08:08.092 --> 00:08:11.760 and move things along quite rapidly

149 00:08:11.760 --> 00:08:14.893 even though we're trying to maintain the rigor

150 00:08:14.893 --> 00:08:19.130 just as we would in a phase III randomized clinical trial

151 00:08:19.130 --> 00:08:20.820 in an academic setting.

152 00:08:20.820 --> 00:08:23.640 And then relevant, we wanna be answering

153 00:08:23.640 --> 00:08:27.000 the most important public health questions of the day.

154 00:08:27.000 --> 00:08:31.563 And those would be decided by public health leaders,

155 00:08:32.460 --> 00:08:37.460 policy directors and ministry of health officials

156 00:08:39.376 --> 00:08:41.580 at the different country,

157 00:08:41.580 --> 00:08:44.040 district and even community levels as well

158 00:08:44.040 --> 00:08:45.750 as the community itself.

159 00:08:45.750 --> 00:08:48.360 So it's different than in the case of, say,

160 00:08:48.360 --> 00:08:51.439 academia where somebody is a research oncologist

161 00:08:51.439 --> 00:08:53.610 and they're working on breast cancer and trying

162 00:08:53.610 --> 00:08:57.690 to figure out some new treatments to cure and prolong

163 00:08:57.690 --> 00:09:00.870 the life and quality of life of people with breast cancer.

164 00:09:00.870 --> 00:09:04.080 Implementation scientists wouldn't necessarily be

165 00:09:04.080 --> 00:09:06.750 choosing the topical area of interest.

166 00:09:06.750 --> 00:09:09.390 They would let the public health community

167 00:09:09.390 --> 00:09:10.500 make those choices.

168 00:09:10.500 --> 00:09:13.380 And then where we might come in is, okay,

169 00:09:13.380 --> 00:09:16.140 this is an important policy question,

170 00:09:16.140 --> 00:09:18.870 how are we gonna study this and get you some answers,

171 00:09:18.870 --> 00:09:20.673 rigorously and rapidly.

172 00:09:24.327 --> 00:09:28.323 So given all of what I've said,

173 00:09:29.280 --> 00:09:31.980 it might be evident that implementation science

174 00:09:31.980 --> 00:09:34.819 is somewhat different from epidemiology,

175 00:09:34.819 --> 00:09:37.620 clinical research and so forth.

176 00:09:37.620 --> 00:09:40.980 And at the study design level we have

177 00:09:40.980 --> 00:09:42.930 these sorts of considerations.

178 00:09:42.930 --> 00:09:46.680 So the first one is that implementation science

179 00:09:46.680 --> 00:09:49.410 is guided by implementation science theory

180 00:09:49.410 --> 00:09:51.201 models and frameworks.

181 00:09:51.201 --> 00:09:54.870 What I mean by that are, there are social science

182 00:09:54.870 --> 00:09:59.870 theories of behavioral change such as CFIR,

183 00:09:59.910 --> 00:10:02.907 the consolidated framework for implementation

184 00:10:02.907 --> 00:10:05.940 research or RE-AIM.

185 00:10:05.940 --> 00:10:07.500 There's a number of them.

186 00:10:07.500 --> 00:10:11.546 And they guide the work in the sense

187 00:10:11.546 --> 00:10:16.330 that they help determine where we are in the pipeline

188 00:10:19.115 --> 00:10:24.115 of identifying barriers to full uptake at high quality

189 00:10:25.260 --> 00:10:28.600 of a particular intervention and

190 00:10:30.000 --> 00:10:32.880 what has been facilitating this so far

191 00:10:32.880 --> 00:10:35.040 in this particular context.

192 00:10:35.040 --> 00:10:37.770 And then figuring out how to expand it,

193 00:10:37.770 --> 00:10:40.980 how to adapt it in a new setting and so forth.

194 00:10:40.980 --> 00:10:44.175 And many of these things in involve behavioral change

195 00:10:44.175 --> 00:10:47.790 and other sorts of human factors that are

196 00:10:47.790 --> 00:10:52.790 not typically the objects of study of clinical researchers,

197 00:10:53.464 --> 00:10:56.890 epidemiologists and biostatisticians.

198 00:10:56.890 --> 00:11:01.354 So implementation science brings in some new team members,

199 00:11:01.354 --> 00:11:06.354 namely social scientists, who might be psychologists,

200 00:11:07.470 --> 00:11:12.470 social workers, medical anthropologists,

201 00:11:12.570 --> 00:11:15.630 and then also economists because we still tend

202 00:11:15.630 --> 00:11:18.630 to be looking at cost from the sustainability

203 00:11:18.630 --> 00:11:19.533 point of view.

204 00:11:20.760 --> 00:11:22.050 So I think I've already mentioned

205 00:11:22.050 --> 00:11:24.900 that implementation science tends to intrinsically

206 00:11:24.900 --> 00:11:28.831 be multilevel, because in terms of developing

207 00:11:28.831 --> 00:11:32.070 and sustaining successful interventions

208 00:11:32.070 --> 00:11:34.950 to address important public health programs,

209 00:11:34.950 --> 00:11:39.230 we need to engage often the healthcare system policymakers,

210 00:11:39.230 --> 00:11:43.050 organizational leaders, healthcare providers,

211 00:11:43.050 --> 00:11:48.050 clients and their families and social networks.

212 00:11:48.540 --> 00:11:52.074 And social networks, I'd like to just say a word about,

213 00:11:52.074 --> 00:11:54.450 it's a little throw in here,

214 00:11:54.450 --> 00:11:57.810 but actually it's an area of research for my group

215 00:11:57.810 --> 00:12:00.180 and maybe other people who are participating

216 00:12:00.180 --> 00:12:02.920 in this discussion that

217 00:12:04.230 --> 00:12:09.230 on the provider and client level, at least,

218 00:12:09.740 --> 00:12:12.030 it's quite possible and it's starting

219 00:12:12.030 --> 00:12:15.950 to become increasingly documented that interventions

220 00:12:15.950 --> 00:12:20.056 that not everybody, not all providers and not all

221 00:12:20.056 --> 00:12:23.909 clients necessarily need to receive an intervention

222 00:12:23.909 --> 00:12:27.070 in order for an intervention to spread

223 00:12:27.070 --> 00:12:28.710 throughout a health system

224 00:12:28.710 --> 00:12:31.200 or throughout a community because people have

225 00:12:31.200 --> 00:12:35.068 social relationships and can influence one another

226 00:12:35.068 --> 00:12:37.902 in terms of the adoption of new practices

227 00:12:37.902 --> 00:12:41.100 at the provider level or the uptake of new

228 00:12:41.100 --> 00:12:45.360 interventions at the client and family, neighborhood,

229 00:12:45.360 --> 00:12:47.880 workforce and so forth level.

230 00:12:47.880 --> 00:12:51.300 So we're interested in leveraging these networks

231 00:12:51.300 --> 00:12:54.930 to perhaps make certain types of public

232 00:12:54.930 --> 00:12:59.340 health interventions be more cost-effective and have

233 00:12:59.340 --> 00:13:01.653 wider reach and sustainability.

234 00:13:03.240 --> 00:13:06.690 Another piece is that implementation science studies

235 00:13:06.690 --> 00:13:10.020 tend to be dynamic in that many of you,

236 00:13:10.020 --> 00:13:12.867 if you've worked in HIV, it's very well known, say,

237 00:13:12.867 --> 00:13:15.930 the HIV treatment cascade,

238 00:13:15.930 --> 00:13:18.540 the TB treatment cascade and so forth.

239 00:13:18.540 --> 00:13:21.840 And then to say prevent, say,

240 00:13:21.840 --> 00:13:26.443 HIV or to ensure the highest quality of life of people

241 00:13:26.443 --> 00:13:28.470 who are HIV positive,

242 00:13:28.470 --> 00:13:31.140 there are all these different steps along the way

243 00:13:31.140 --> 00:13:34.923 that involve different types of treatments, interventions,

244 00:13:34.923 --> 00:13:37.320 actors at different levels.

245 00:13:37.320 --> 00:13:40.490 And one of the things we do in implementation science

246 00:13:40.490 --> 00:13:43.260 is we might map those cascades and think,

247 00:13:43.260 --> 00:13:46.110 figure out where the weak points are and then figure

248 00:13:46.110 --> 00:13:50.159 out what interventions can we bring in to strengthen

249 00:13:50.159 --> 00:13:54.963 the success of the entire cascade by targeting

250 00:13:56.760 --> 00:13:58.650 its weakest points.

251 00:13:58.650 --> 00:14:01.980 So the timing of delivery of intervention components,

252 00:14:01.980 --> 00:14:03.750 can be, along the cascade,

253 00:14:03.750 --> 00:14:06.843 can be as important as the delivery itself.

254 00:14:07.920 --> 00:14:11.766 And then as I mentioned, just as an effectiveness trials,

255 00:14:11.766 --> 00:14:14.398 you know, I can't say for sure there would never be

256 00:14:14.398 --> 00:14:16.840 an implementation study that

257 00:14:17.730 --> 00:14:19.980 wasn't individually randomized.

258 00:14:19.980 --> 00:14:23.460 But in general the implication for design

259 00:14:23.460 --> 00:14:26.460 of these sorts of studies is that they tend to be

260 00:14:26.460 --> 00:14:30.180 group level assignments to study intervention components

261 00:14:30.180 --> 00:14:32.820 and they could be at the district, hospital,

262 00:14:32.820 --> 00:14:36.475 facility, practice, provider or community levels

263 00:14:36.475 --> 00:14:39.610 and even clients themselves can be group level.

264 00:14:39.610 --> 00:14:42.360 If you think that every client is a member

265 00:14:42.360 --> 00:14:46.230 of a social network and that by including them

266 00:14:46.230 --> 00:14:48.630 we're actually indirectly including their entire

267 00:14:48.630 --> 00:14:50.433 social network as well.

268 00:14:57.558 --> 00:15:00.000 Okay. I'm now trying to go on to the next slide.

269 00:15:00.000 --> 00:15:03.843 It's not behaving. Let me try again.

270 00:15:05.370 --> 00:15:07.940 Oh, there we go. So...

271 00:15:11.790 --> 00:15:14.040 So there's many study design options

272 00:15:14.040 --> 00:15:18.090 in implementation science and they depend on a wide

273 00:15:18.090 --> 00:15:19.363 range of factors.

274 00:15:19.363 --> 00:15:23.010 The factors are listed here what the research question is,

275 00:15:23.010 --> 00:15:25.552 the type of clinical or public health intervention,

276 00:15:25.552 --> 00:15:29.250 the type of implementation strategy, feasibility,

277 00:15:29.250 --> 00:15:33.780 cost in personnel, the setting, who are the stakeholders,

278 00:15:33.780 --> 00:15:37.320 what are the logistics, the target population,

279 00:15:37.320 --> 00:15:40.688 timeline, ethical issues come up and they in fact can

280 00:15:40.688 --> 00:15:43.140 be very different than those that we're used

281 00:15:43.140 --> 00:15:46.517 to in randomized clinical trials of investigated

282 00:15:46.517 --> 00:15:48.570 drugs and devices.

283 00:15:48.570 --> 00:15:50.580 And that's an area of active development

284 00:15:50.580 --> 00:15:52.950 that I'm quite interested in and there might be

285 00:15:52.950 --> 00:15:55.830 other people here who are interested in being involved

286 00:15:55.830 --> 00:15:57.359 in this as well.

287 00:15:57.359 --> 00:16:01.473 And then... And then funding opportunities.

288 00:16:04.050 --> 00:16:07.173 So... There we go.

289 00:16:08.160 --> 00:16:11.460 Okay, so... Sorry, I got this.

290 00:16:11.460 --> 00:16:12.480 Okay, there we go.

291 00:16:12.480 --> 00:16:15.746 So we have a number of to study design options

292 00:16:15.746 --> 00:16:19.710 in implementation science and the rest of this talk

293 00:16:19.710 --> 00:16:22.523 is actually gonna be focusing on this aspect

294 00:16:22.523 --> 00:16:25.491 of what I, in the first part I kind of set the stage

295 00:16:25.491 --> 00:16:28.970 by kind of talking about some of the key issues

296 00:16:28.970 --> 00:16:31.316 in implementation science and then that of course

297 00:16:31.316 --> 00:16:34.473 informs what the study design options are.

298 00:16:35.610 --> 00:16:39.480 And Ike, I'm not monitoring the chat and I do welcome

299 00:16:39.480 --> 00:16:40.680 questions and comments.

300 00:16:40.680 --> 00:16:44.190 So if any are coming up, Ike, it would be great

301 00:16:44.190 --> 00:16:47.880 if you could throw them in because I'm just,

302 00:16:47.880 --> 00:16:51.210 I'm not seeing them at the same time I'm seeing my slides.

303 00:16:51.210 --> 00:16:54.690 So we talked about experimental study design,

304 00:16:54.690 --> 00:16:56.550 so those are usually,

305 00:16:56.550 --> 00:16:58.743 are there any questions or comments so far?

306 00:17:01.590 --> 00:17:02.700 <v Speaker>Further you go on,</v>

307 00:17:02.700 --> 00:17:05.040 we ask the questions at the end of the lecture,

308 00:17:05.040 --> 00:17:10.040 let everybody write down the questions or when we open

309 00:17:10.856 --> 00:17:13.650 for question and answer, we can ask.

310 00:17:13.650 --> 00:17:15.450 Thank you. <v ->Okay, sure. That's great.</v>

311 00:17:15.450 --> 00:17:17.610 We can do it that way as well.

312 00:17:17.610 --> 00:17:20.880 So experimental, that's kind of also synonym

313 00:17:20.880 --> 00:17:23.067 for a randomized design.

314 00:17:23.067 --> 00:17:27.600 So randomization, as many of you probably know,

315 00:17:27.600 --> 00:17:31.923 is considered the highest form of, the highest type,

316 00:17:34.500 --> 00:17:37.700 the strongest form of study design.

317 00:17:37.700 --> 00:17:39.940 It allows causal inference

318 00:17:41.760 --> 00:17:45.780 in the simplest ways, with the simplest types of designs,

319 00:17:45.780 --> 00:17:49.316 and when we randomize by randomly assigning

320 00:17:49.316 --> 00:17:54.316 the intervention to one group versus another,

321 00:17:54.616 --> 00:17:59.062 we on average control for all sorts of confounding,

322 00:17:59.062 --> 00:18:01.800 ensuring balance between the two groups,

323 00:18:01.800 --> 00:18:05.223 that imbalances might not lead to,

324 00:18:07.255 --> 00:18:12.000 under the null would not lead to incorrect inferences,

325 00:18:12.000 --> 00:18:15.600 and on average will give us valid estimates,

326 00:18:15.600 --> 00:18:20.220 it will control for various sorts of selection bias

327 00:18:20.220 --> 00:18:22.920 and we don't have any measurement error

328 00:18:22.920 --> 00:18:27.920 because we know who we gave who or what groups we gave

329 00:18:29.220 --> 00:18:31.140 the intervention to or not.

330 00:18:31.140 --> 00:18:33.810 So like we have many, several types

331 00:18:33.810 --> 00:18:36.300 of these experimental designs,

332 00:18:36.300 --> 00:18:38.380 some of which most people

333 00:18:38.380 --> 00:18:41.850 in this symposium would be familiar with RCT

334 00:18:41.850 --> 00:18:43.650 randomized clinical trials

335 00:18:43.650 --> 00:18:45.780 which are individually randomized.

336 00:18:45.780 --> 00:18:48.090 And then that we use the acronym CRT

337 00:18:48.090 --> 00:18:50.040 or cluster-randomized trial,

338 00:18:50.040 --> 00:18:51.983 they're also group randomized trials,

339 00:18:51.983 --> 00:18:54.570 very common in implementation science.

340 00:18:54.570 --> 00:18:58.680 And then there's another type of cluster-randomized trial

341 00:18:58.680 --> 00:19:00.810 that's become increasingly popular.

342 00:19:00.810 --> 00:19:03.570 The stepped wedge design and I'm gonna be talking

343 00:19:03.570 --> 00:19:06.630 in some detail about that and our group has here

344 00:19:06.630 --> 00:19:09.330 at Yale at the Center for Methods

345 00:19:09.330 --> 00:19:12.600 in Implementation and Prevention Science,

346 00:19:12.600 --> 00:19:16.860 we've done quite a bit of work on extending study design,

347 00:19:16.860 --> 00:19:19.290 CRTs and stepped wedge designs.

348 00:19:19.290 --> 00:19:22.830 There's a very useful design called the MOST design

349 00:19:22.830 --> 00:19:26.135 that is becoming increasingly popular

350 00:19:26.135 --> 00:19:29.250 in implementation science that I'll talk about.

351 00:19:29.250 --> 00:19:32.490 And then there's the LAGO design, learn as you go design,

352 00:19:32.490 --> 00:19:35.100 which has been developed by our group that I'll also

353 00:19:35.100 --> 00:19:36.419 talk about briefly.

354 00:19:36.419 --> 00:19:41.419 And then, in the interest of..

355 00:19:42.000 --> 00:19:46.581 Yes. Okay. <v ->He is gone. He is gone.</v>

356 00:19:46.581 --> 00:19:48.030 <v Presenter>Okay, sure.</v>

357 00:19:48.030 --> 00:19:53.030 In the interest of rapid in implementation science,

358 00:19:53.250 --> 00:19:55.890 there are also quasi experimental designs.

359 00:19:55.890 --> 00:19:59.723 So these designs take advantage of certain features

360 00:19:59.723 --> 00:20:03.780 of the data in order to get sort

361 00:20:03.780 --> 00:20:06.660 of under certain circumstances that are very well

362 00:20:06.660 --> 00:20:09.956 defined and may or may not be valid, but often are,

363 00:20:09.956 --> 00:20:12.739 we can get inference that's almost as strong

364 00:20:12.739 --> 00:20:15.557 as that in the randomized designs without a having

365 00:20:15.557 --> 00:20:20.557 to randomize, and randomization is an expensive

366 00:20:20.880 --> 00:20:25.410 and slow process and often may not be,

367 00:20:25.410 --> 00:20:28.050 I'm starting to increasingly think myself,

368 00:20:28.050 --> 00:20:31.080 the very best way to get the answers that we need

369 00:20:31.080 --> 00:20:35.760 in public health rigorously and rapidly.

370 00:20:35.760 --> 00:20:39.510 So in the group of quasi-experimental designs,

371 00:20:39.510 --> 00:20:41.601 we have pre-post designs,

372 00:20:41.601 --> 00:20:43.620 difference in difference designs,

373 00:20:43.620 --> 00:20:46.122 interrupted time series designs and controlled

374 00:20:46.122 --> 00:20:48.518 interrupted time series designs.

375 00:20:48.518 --> 00:20:51.960 And I'll talk a little bit about those as well.

376 00:20:51.960 --> 00:20:53.640 And then finally

377 00:20:53.640 --> 00:20:56.760 there's observational research which in my view has

378 00:20:56.760 --> 00:20:59.760 been underappreciated and underutilized

379 00:20:59.760 --> 00:21:01.860 in implementation science because there's such

380 00:21:01.860 --> 00:21:04.860 a big emphasis on, I think,

381 00:21:04.860 --> 00:21:07.312 probably the rigor and wanting to be able to make

382 00:21:07.312 --> 00:21:10.813 causal inference without having to make

383 00:21:10.813 --> 00:21:12.450 a lot of assumptions.

384 00:21:12.450 --> 00:21:15.120 So there's been a strong emphasis on experimental

385 00:21:15.120 --> 00:21:19.606 designs and so far very much less use

386 00:21:19.606 --> 00:21:22.230 of observational design such as the classic

387 00:21:22.230 --> 00:21:25.800 cohort cross-sectional and case-control studies

388 00:21:25.800 --> 00:21:30.123 that can be embedded in the ongoing practice

389 00:21:30.123 --> 00:21:34.023 of implementing public health programs

390 00:21:34.023 --> 00:21:37.235 and simultaneously evaluating them using

391 00:21:37.235 --> 00:21:40.680 observational data methods, in particular,

392 00:21:40.680 --> 00:21:42.453 causal inference methods.

393 00:21:43.290 --> 00:21:45.840 And then finally there are some other designs

394 00:21:45.840 --> 00:21:47.450 that you may have heard about that have come up

395 00:21:47.450 --> 00:21:50.100 in implementation science, hybrid designs

396 00:21:50.100 --> 00:21:51.570 and mixed methods designs,

397 00:21:51.570 --> 00:21:54.273 which I'll also mention as we go along.

398 00:21:57.330 --> 00:22:01.833 So, quite a lot of options, actually, as we can see.

399 00:22:07.470 --> 00:22:12.330 So, okay. All right, there we go.

400 00:22:12.330 --> 00:22:17.330 So here, this slide refers to these two citations

401 00:22:17.370 --> 00:22:19.830 that I have down here at the bottom and it's called

402 00:22:19.830 --> 00:22:20.663 the PRECIS,

403 00:22:22.770 --> 00:22:26.580 Pragmatic-Explanatory Continuum Indicator Summary.

404 00:22:26.580 --> 00:22:31.470 And it's a way of evaluating how pragmatic your trial is.

405 00:22:31.470 --> 00:22:33.930 And in some cases in the United States we have

406 00:22:33.930 --> 00:22:36.990 this pretty important funding mechanism called

407 00:22:36.990 --> 00:22:41.990 PCORI and they explicitly fund pragmatic trials.

408 00:22:42.480 --> 00:22:46.948 And if your trial is pragmatic, it isn't pragmatic enough,

409 00:22:46.948 --> 00:22:50.250 it's very unlikely to be accepted

410 00:22:50.250 --> 00:22:52.770 for PCORI funding mechanism.

411 00:22:52.770 --> 00:22:56.850 And what the PCORI, this pragmatic trial,

412 00:22:56.850 --> 00:22:58.620 there are these various criteria,

413 00:22:58.620 --> 00:23:03.620 I've mentioned some of them already, so eligibility,

414 00:23:04.230 --> 00:23:06.240 and these all are on Likert scales,

415 00:23:06.240 --> 00:23:07.320 so the idea is, again,

416 00:23:07.320 --> 00:23:10.290 the fewer eligibility requirements, the better,

417 00:23:10.290 --> 00:23:14.310 recruitment, the more general and open the recruitment is,

418 00:23:14.310 --> 00:23:16.080 the better, the setting,

419 00:23:16.080 --> 00:23:20.040 the more community-based population based the setting,

420 00:23:20.040 --> 00:23:23.700 the better, the organization and so forth.

421 00:23:23.700 --> 00:23:27.302 So all of these things are used to evaluate

422 00:23:27.302 --> 00:23:32.302 how pragmatic a trial is and it's worth doing,

423 00:23:32.495 --> 00:23:35.100 if you're designing a study and

424 00:23:35.100 --> 00:23:39.696 you're really wanting it to be in the effectiveness,

425 00:23:39.696 --> 00:23:43.122 you know, implementation part of the continuum,

426 00:23:43.122 --> 00:23:47.860 you can get access to these papers and literally rank

427 00:23:47.860 --> 00:23:51.752 your design and experiment with different possible

428 00:23:51.752 --> 00:23:55.115 designs and try to get your study to be more

429 00:23:55.115 --> 00:23:56.550 and more pragmatic.

430 00:23:56.550 --> 00:23:59.113 And I highly recommend it because that's what we need

431 00:23:59.113 --> 00:24:00.240 in public health.

432 00:24:00.240 --> 00:24:03.690 We need pragmatic trials that will really tell us

433 00:24:03.690 --> 00:24:07.356 how well our interventions will work at broad

434 00:24:07.356 --> 00:24:11.253 scale in the full population in the community.

435 00:24:17.730 --> 00:24:21.900 So, and experimental designs can be pragmatic.

436 00:24:21.900 --> 00:24:24.780 That's why I showed the pragmatic slide first.

437 00:24:24.780 --> 00:24:27.640 Even a randomized controlled trial, an RCT,

438 00:24:28.487 --> 00:24:31.260 can be rated on the precise scale and be

439 00:24:31.260 --> 00:24:32.520 made more pragmatic.

440 00:24:32.520 --> 00:24:34.020 And then, as I mentioned,

441 00:24:34.020 --> 00:24:37.680 cluster-randomized trials and then stepped wedge designs.

442 00:24:37.680 --> 00:24:40.260 And here's a paper that was published

443 00:24:40.260 --> 00:24:43.023 in the Annual Review of Public Health if you wanted to,

444 00:24:43.023 --> 00:24:45.660 I'll read a little bit more of an overview

445 00:24:45.660 --> 00:24:47.280 of the study design options

446 00:24:47.280 --> 00:24:50.403 for dissemination and implementation science.

447 00:24:53.850 --> 00:24:56.285 So now I'm gonna talk about cluster-randomized trials

448 00:24:56.285 --> 00:24:59.068 and I'm gonna give an example of a trial

449 00:24:59.068 --> 00:25:01.353 that I worked on myself.

450 00:25:02.430 --> 00:25:06.033 I went a little too far. I think I did again, sorry.

451 00:25:07.433 --> 00:25:08.266 No, no. Okay, there we go.

452 00:25:08.266 --> 00:25:12.335 So cluster-randomized trials, this is like a graphic,

453 00:25:12.335 --> 00:25:14.743 it gives a graphical view of the difference

454 00:25:14.743 --> 00:25:16.950 between cluster-randomized

455 00:25:16.950 --> 00:25:18.810 and individually randomized trials.

456 00:25:18.810 --> 00:25:21.480 So over here on the left hand side we have

457 00:25:21.480 --> 00:25:25.260 a individually randomized trial and on the right hand

458 00:25:25.260 --> 00:25:27.660 side we have a cluster-randomized trial.

459 00:25:27.660 --> 00:25:31.140 You can see that they can have the same amount of people.

460 00:25:31.140 --> 00:25:34.200 So each one of these smiley phases is a participant

461 00:25:34.200 --> 00:25:35.487 in the study.

462 00:25:35.487 --> 00:25:40.290 But in a cluster-randomized trial, we randomized by groups.

463 00:25:40.290 --> 00:25:42.180 So there were four groups here.

464 00:25:42.180 --> 00:25:44.970 And then two of them became part of the intervention

465 00:25:44.970 --> 00:25:47.310 group and then two of the groups became part

466 00:25:47.310 --> 00:25:48.240 of the control group.

467 00:25:48.240 --> 00:25:51.060 And then of course every group member within each

468 00:25:51.060 --> 00:25:53.811 of those groups became part of the intervention group

469 00:25:53.811 --> 00:25:56.307 and so forth for the control group.

470 00:25:56.307 --> 00:25:57.600 And so that's the idea.

471 00:25:57.600 --> 00:26:00.133 And then when that is done,

472 00:26:00.133 --> 00:26:02.820 and oftentimes it has to be done

473 00:26:02.820 --> 00:26:04.991 because the intervention is actually applied

474 00:26:04.991 --> 00:26:06.481 at the group level.

475 00:26:06.481 --> 00:26:10.289 And even when it doesn't have to be done pragmatically

476 00:26:10.289 --> 00:26:14.430 and in terms of rapidity, for example,

477 00:26:14.430 --> 00:26:17.520 it might make sense to have a study design

478 00:26:17.520 --> 00:26:20.790 that's cluster-randomized anyway, that's the way

479 00:26:20.790 --> 00:26:23.223 we would go and that's usually what I see.

480 00:26:24.600 --> 00:26:28.110 And the study design calculations and so forth are all,

481 00:26:28.110 --> 00:26:31.200 and the analysis are somewhat different when we have this.

482 00:26:31.200 --> 00:26:35.370 So now I'm gonna go over a case study that I was

483 00:26:35.370 --> 00:26:36.420 involved with when I was

484 00:26:36.420 --> 00:26:39.060 at the Harvard School of Public Health that was

485 00:26:39.060 --> 00:26:42.150 in collaboration with Management Development for Health

486 00:26:42.150 --> 00:26:45.870 in Dar es Salaam, Tanzania, an NGO, that's the PEPFAR,

487 00:26:45.870 --> 00:26:49.650 implementing partner in the greater Dar es Salaam Region.

488 00:26:49.650 --> 00:26:52.170 And together we conducted the study called

489 00:26:52.170 --> 00:26:57.170 Familia Salama and it was a 2x2 cluster-randomized trial.

490 00:26:57.540 --> 00:26:59.489 So 2x2 factorial means,

491 00:26:59.489 --> 00:27:02.068 it's another design feature that can be used

492 00:27:02.068 --> 00:27:05.310 in any ones of these types of studies.

493 00:27:05.310 --> 00:27:10.200 But where it's a very old idea but it allows us

494 00:27:10.200 --> 00:27:13.300 to study multiple interventions

495 00:27:15.210 --> 00:27:19.060 or implementation strategies components at the same

496 00:27:19.060 --> 00:27:21.540 time in one single study.

497 00:27:21.540 --> 00:27:24.720 And there's no kind of statistical limit.

498 00:27:24.720 --> 00:27:27.600 You don't lose power.

499 00:27:27.600 --> 00:27:32.430 You could do a 2x2x2 or a 2x2x2x2 and so forth.

500 00:27:32.430 --> 00:27:35.700 The main limitation to how many things we can study

501 00:27:35.700 --> 00:27:39.269 at one time using this factorial approach is actually

502 00:27:39.269 --> 00:27:41.820 just logistics and feasibility.

503 00:27:41.820 --> 00:27:44.404 It gets very complicated and confusing

504 00:27:44.404 --> 00:27:47.700 when you're trying to run a study at scale

505 00:27:47.700 --> 00:27:51.340 at a population level and like every group like

506 00:27:51.340 --> 00:27:53.100 this one is doing this, this and this,

507 00:27:53.100 --> 00:27:56.670 and then the next one is doing some other combination,

508 00:27:56.670 --> 00:27:59.010 it can start to become unmanageable.

509 00:27:59.010 --> 00:28:01.200 But I also would like to bring it up and encourage

510 00:28:01.200 --> 00:28:05.720 people like at least if you are conducting a study

511 00:28:05.720 --> 00:28:08.450 and you're going and you have like, say, you know,

512 00:28:08.450 --> 00:28:11.023 if you have a well-funded study, you know,

513 00:28:11.023 --> 00:28:14.446 a population-based effectiveness or implementation

514 00:28:14.446 --> 00:28:19.446 trial with for very little, for no increased sample size,

515 00:28:20.880 --> 00:28:25.880 you can basically add another factor and study two things,

516 00:28:26.310 --> 00:28:28.200 and it's like why not?

517 00:28:28.200 --> 00:28:30.966 So just throwing that out 'cause it's underutilized

518 00:28:30.966 --> 00:28:34.653 as a design approach.

519 00:28:35.580 --> 00:28:38.490 But here we did this where we compared,

520 00:28:38.490 --> 00:28:41.160 we were looking at an enhanced community health

521 00:28:41.160 --> 00:28:44.298 worker versus standard of care

522 00:28:44.298 --> 00:28:46.290 to increase uptake

523 00:28:46.290 --> 00:28:49.380 of the World Health Organization's recommendation

524 00:28:49.380 --> 00:28:51.780 that all pregnant women should have at least

525 00:28:51.780 --> 00:28:53.760 four ANC visits.

526 00:28:53.760 --> 00:28:57.930 And then that was crossed with option A versus option

527 00:28:57.930 --> 00:29:01.920 B, which are two approaches to prevention of mother

528 00:29:01.920 --> 00:29:04.440 to child transmission of HIV.

529 00:29:04.440 --> 00:29:08.160 Now option B has been universally adopted among

530 00:29:08.160 --> 00:29:10.170 HIV positive mothers.

531 00:29:10.170 --> 00:29:13.383 So we had these two things crossed in this trial.

532 00:29:16.860 --> 00:29:21.123 And here is the name of the paper that's actually

533 00:29:21.123 --> 00:29:24.570 recently been submitted, just actually just publishing

534 00:29:24.570 --> 00:29:26.407 on one of the two factors,

535 00:29:26.407 --> 00:29:29.250 "The impact of community health worker intervention

536 00:29:29.250 --> 00:29:31.183 on uptake of antenatal care:

537 00:29:31.183 --> 00:29:33.330 a cluster-randomized, pragmatic trial..."

538 00:29:33.330 --> 00:29:35.880 And see, very, very large trial,

539 00:29:35.880 --> 00:29:39.810 almost 250,000 women in Dar es Salaam, Tanzania

540 00:29:39.810 --> 00:29:43.170 who reported to ANC at least once

541 00:29:43.170 --> 00:29:44.670 and were found to be pregnant.

542 00:29:44.670 --> 00:29:47.490 And you can see that these kinds of big population

543 00:29:47.490 --> 00:29:50.970 based effectiveness and implementation trials are

544 00:29:50.970 --> 00:29:54.863 often highly collaborative and they involve a big team,

545 00:29:54.863 --> 00:29:58.260 if we're working together in an international partnership,

546 00:29:58.260 --> 00:30:01.515 you can see that there are people you know from different,

547 00:30:01.515 --> 00:30:04.740 both from, say, the host country as well as, say,

548 00:30:04.740 --> 00:30:08.820 the part technical support partners and so forth.

549 00:30:08.820 --> 00:30:10.800 In our case we had people involved

550 00:30:10.800 --> 00:30:13.920 from Norway, Germany, the United States

551 00:30:13.920 --> 00:30:15.420 and Tanzania involved

552 00:30:15.420 --> 00:30:17.235 in this trial and here's all the different

553 00:30:17.235 --> 00:30:20.043 institutions that we all came from.

554 00:30:22.200 --> 00:30:24.473 And so here's a schematic of the design.

555 00:30:24.473 --> 00:30:29.473 And so this sort of an intervention was implemented

556 00:30:29.760 --> 00:30:31.740 and rolled out at the ward level.

557 00:30:31.740 --> 00:30:35.190 So in Dar es Salaam there were two,

558 00:30:35.190 --> 00:30:37.170 at that time there were three districts

559 00:30:37.170 --> 00:30:39.780 for the whole greater Dar es Salaam region

560 00:30:39.780 --> 00:30:42.930 and we included two of the three districts.

561 00:30:42.930 --> 00:30:44.182 And as many of you may know,

562 00:30:44.182 --> 00:30:46.742 Dar es Salaam is one of the largest cities

563 00:30:46.742 --> 00:30:49.470 in Sub-Saharan Africa.

564 00:30:49.470 --> 00:30:52.800 And within those two districts there were 60

565 00:30:52.800 --> 00:30:56.670 political wards and we randomized them to one of,

566 00:30:56.670 --> 00:30:58.140 you could say, four arms,

567 00:30:58.140 --> 00:31:00.371 where first the 60 wards were randomly

568 00:31:00.371 --> 00:31:04.110 assigned to either the community health

569 00:31:04.110 --> 00:31:06.038 worker intervention or not.

570 00:31:06.038 --> 00:31:10.083 And 36 were assigned to the community health

571 00:31:10.083 --> 00:31:14.370 ward intervention, 24 to standard of care.

572 00:31:14.370 --> 00:31:19.370 And then of those 36, 22 went to option B, 14 to option A,

573 00:31:20.670 --> 00:31:21.707 and then among and so forth.

574 00:31:21.707 --> 00:31:24.360 So you can see how that's divided up.

575 00:31:24.360 --> 00:31:25.860 And then you might be wondering, well,

576 00:31:25.860 --> 00:31:30.028 it's kind of imbalanced by ward, and why was that?

577 00:31:30.028 --> 00:31:34.250 This is a tricky aspect of balanced design

578 00:31:34.250 --> 00:31:38.250 in a cluster-randomized trial because the wards

579 00:31:38.250 --> 00:31:40.628 did not have the same populations,

580 00:31:40.628 --> 00:31:44.250 and the same expected populations of pregnant women

581 00:31:44.250 --> 00:31:47.170 who would be delivering during the study period.

582 00:31:47.170 --> 00:31:50.220 So we were trading off both kind of having

583 00:31:50.220 --> 00:31:52.761 a sufficient number of wards with having

584 00:31:52.761 --> 00:31:56.040 a sufficient number of women within the wards.

585 00:31:56.040 --> 00:32:01.040 And so you can see that what ended up happening was

586 00:32:01.680 --> 00:32:04.623 we expected to have around,

587 00:32:04.623 --> 00:32:07.677 in the first intervention we expected to have

588 00:32:07.677 --> 00:32:12.240 a certain number of pregnant women in option A

589 00:32:12.240 --> 00:32:14.250 versus option B.

590 00:32:14.250 --> 00:32:17.370 And what we observed was quite different.

591 00:32:17.370 --> 00:32:20.460 And then similarly for the community health

592 00:32:20.460 --> 00:32:24.692 worker intervention, we did our best to try to balance

593 00:32:24.692 --> 00:32:27.120 the number of women,

594 00:32:27.120 --> 00:32:29.310 pregnant women who would be in the community health

595 00:32:29.310 --> 00:32:32.910 worker intervention versus standard of care.

596 00:32:32.910 --> 00:32:36.543 And then what happened was we saw something very different.

597 00:32:37.793 --> 00:32:39.510 And then in addition you might

598 00:32:39.510 --> 00:32:41.880 notice something else which some of you who have

599 00:32:41.880 --> 00:32:45.210 actually run studies may have also seen that it can

600 00:32:45.210 --> 00:32:48.300 be quite challenging to specify what some

601 00:32:48.300 --> 00:32:52.410 of these input parameters are before a study is conducted.

602 00:32:52.410 --> 00:32:56.010 So one thing that happened was you can see

603 00:32:56.010 --> 00:33:00.870 that what we expected

604 00:33:00.870 --> 00:33:02.850 and then what we observed was

605 00:33:02.850 --> 00:33:04.140 we observed, you know,

606 00:33:04.140 --> 00:33:08.700 quite a few more pregnancies during the study period

607 00:33:08.700 --> 00:33:09.960 than were expected.

608 00:33:09.960 --> 00:33:13.430 We underestimated the fertility rate in this area,

609 00:33:13.430 --> 00:33:16.281 based on the population level data we had.

610 00:33:16.281 --> 00:33:18.450 And then you'll also see a little later

611 00:33:18.450 --> 00:33:23.450 on we also overestimated the HIV transmission rate.

612 00:33:23.736 --> 00:33:27.540 Or actually what we really overestimated was

613 00:33:27.540 --> 00:33:29.460 the proportion of pregnant women who are gonna

614 00:33:29.460 --> 00:33:30.780 be HIV positive.

615 00:33:30.780 --> 00:33:33.693 So as many of you know,

616 00:33:35.070 --> 00:33:38.310 the various programs that have been implemented to kind

617 00:33:38.310 --> 00:33:41.040 of end the AIDS epidemic have been quite successful.

618 00:33:41.040 --> 00:33:42.600 We're not completely there,

619 00:33:42.600 --> 00:33:45.626 but there were huge improvements that were made.

620 00:33:45.626 --> 00:33:47.940 And even during the study period,

621 00:33:47.940 --> 00:33:50.105 from the time we designed the study to the time

622 00:33:50.105 --> 00:33:52.680 the study was actually conducted,

623 00:33:52.680 --> 00:33:57.150 the HIV positivity rate went down substantially.

624 00:33:57.150 --> 00:34:01.454 I think we predicted that it would be around 12% based

625 00:34:01.454 --> 00:34:04.596 on data existing at the time when we designed

626 00:34:04.596 --> 00:34:08.820 and the study and submitted it for funding.

627 00:34:08.820 --> 00:34:11.910 And when we actually ran the study I think it had

628 00:34:11.910 --> 00:34:13.620 dropped to 6%.

629 00:34:13.620 --> 00:34:15.203 So when those kinds of things happen,

630 00:34:15.203 --> 00:34:17.880 they can really detract from the power

631 00:34:17.880 --> 00:34:21.570 of your study unless other types of adaptive study

632 00:34:21.570 --> 00:34:24.723 designs are brought to bear.

633 00:34:24.723 --> 00:34:26.460 But luckily, in our case,

634 00:34:26.460 --> 00:34:31.050 'cause we hadn't planned in an adaptive study design,

635 00:34:31.050 --> 00:34:33.420 we also had a higher pregnancy rate,

636 00:34:33.420 --> 00:34:37.770 so we compensated for the lower HIV rate,

637 00:34:37.770 --> 00:34:39.840 which of course is a wonderful thing,

638 00:34:39.840 --> 00:34:41.435 with a higher pregnancy rate,

639 00:34:41.435 --> 00:34:44.460 so we ended up maybe with around the power

640 00:34:44.460 --> 00:34:47.520 that we might have hoped to have had at the start

641 00:34:47.520 --> 00:34:50.400 with these input parameters being quite different

642 00:34:50.400 --> 00:34:52.203 than what happened in the reality.

643 00:34:55.440 --> 00:34:57.453 So the results here,

644 00:34:58.920 --> 00:35:01.530 intervention significantly increased the likelihood

645 00:35:01.530 --> 00:35:06.360 of attending four or more ANC visits by around 42%.

646 00:35:06.360 --> 00:35:10.290 And the intervention also had a modest beneficial

647 00:35:10.290 --> 00:35:12.750 effect on the total number of ANC visits.

648 00:35:12.750 --> 00:35:14.760 It increased them by 8%.

649 00:35:14.760 --> 00:35:18.510 It wasn't successful in improving the timing

650 00:35:18.510 --> 00:35:19.500 of the first visit.

651 00:35:19.500 --> 00:35:22.650 'Cause another kind of secondary goal was to hope

652 00:35:22.650 --> 00:35:26.160 that women might become aware of their pregnancies

653 00:35:26.160 --> 00:35:29.430 earlier on and get an initial ANC visit

654 00:35:29.430 --> 00:35:31.740 even in their first trimester.

655 00:35:31.740 --> 00:35:34.590 And so what we concluded was that trained community

656 00:35:34.590 --> 00:35:38.280 health workers can increase attendance of ANC visits

657 00:35:38.280 --> 00:35:41.070 in Dar es Salaam in similar settings.

658 00:35:41.070 --> 00:35:44.160 However, earlier additional interventions

659 00:35:44.160 --> 00:35:48.510 would be necessary to promote early initiation of ANC.

660 00:35:48.510 --> 00:35:51.360 And then the study also demonstrates that routine

661 00:35:51.360 --> 00:35:53.171 health systems data can be leveraged

662 00:35:53.171 --> 00:35:57.300 for outcome assessment in trials and program evaluation.

663 00:35:57.300 --> 00:35:59.820 I neglected to dimension that among

664 00:35:59.820 --> 00:36:04.382 these 250,000 pregnancies in these 60 wards

665 00:36:04.382 --> 00:36:08.040 at that time there really wasn't electronic health

666 00:36:08.040 --> 00:36:10.470 records in the facilities.

667 00:36:10.470 --> 00:36:14.784 So what was there were log books where people,

668 00:36:14.784 --> 00:36:19.170 intake healthcare providers would be entering certain

669 00:36:19.170 --> 00:36:22.020 data elements at the different types of clinics

670 00:36:22.020 --> 00:36:23.370 that women were going to.

671 00:36:23.370 --> 00:36:27.077 And what we did was at the end of the day we had

672 00:36:27.077 --> 00:36:31.860 study staff coming in and we had like a database set

673 00:36:31.860 --> 00:36:34.980 up that looked just like the log book and they would

674 00:36:34.980 --> 00:36:37.320 come in and they'd enter all the data from the log

675 00:36:37.320 --> 00:36:38.640 book for that day.

676 00:36:38.640 --> 00:36:40.980 And we did that for all of those pregnancies.

677 00:36:40.980 --> 00:36:45.106 Now, ideally, as more and more healthcare systems

678 00:36:45.106 --> 00:36:48.458 around the world become reliant on electronic

679 00:36:48.458 --> 00:36:51.600 health records, that wouldn't even be necessary.

680 00:36:51.600 --> 00:36:54.327 In a study like this, you know, at full-scale,

681 00:36:54.327 --> 00:36:58.170 250,000 pregnancies over a period of around two

682 00:36:58.170 --> 00:37:02.100 years could be conducted rapidly and rigorously

683 00:37:02.100 --> 00:37:05.880 with no additional research data collection,

684 00:37:05.880 --> 00:37:07.383 which is kind of the goal.

685 00:37:09.660 --> 00:37:13.625 So that's an example of a cluster-randomized trial,

686 00:37:13.625 --> 00:37:17.343 and that's sort of an effectiveness implementation trial.

687 00:37:21.523 --> 00:37:24.420 And maybe I could say something about that,

688 00:37:24.420 --> 00:37:27.780 that the endpoint of, say, women having, say,

689 00:37:27.780 --> 00:37:31.263 four or more ANC visits during their pregnancies,

690 00:37:32.400 --> 00:37:34.230 there's no health outcome there.

691 00:37:34.230 --> 00:37:36.684 It's a pure implementation outcome

692 00:37:36.684 --> 00:37:39.930 where there's an evidence-based intervention,

693 00:37:39.930 --> 00:37:43.230 the WHO has reviewed the data very carefully,

694 00:37:43.230 --> 00:37:45.509 they've made this recommendation and presumably

695 00:37:45.509 --> 00:37:50.509 the idea would be by having four or more ANC visits

696 00:37:50.610 --> 00:37:53.280 and of course receiving quality care at those visits,

697 00:37:53.280 --> 00:37:57.358 that we would be able to increasingly bring down

698 00:37:57.358 --> 00:37:59.550 the maternal mortality rate,

699 00:37:59.550 --> 00:38:01.710 which has also happened all around the world,

700 00:38:01.710 --> 00:38:04.920 as well as the sort of under five perinatal

701 00:38:04.920 --> 00:38:07.290 and neonatal mortality rates.

702 00:38:07.290 --> 00:38:10.140 But we weren't even measuring those as primary outcomes

703 00:38:10.140 --> 00:38:13.140 in the study, that's already been established

704 00:38:13.140 --> 00:38:16.456 through effectiveness and efficacy trials.

705 00:38:16.456 --> 00:38:18.390 And the implementation science we're all

706 00:38:18.390 --> 00:38:21.900 about studying can we successfully implement

707 00:38:21.900 --> 00:38:26.220 a proven intervention, and in this case, at scale,

708 00:38:26.220 --> 00:38:27.903 that's the purpose of the study.

709 00:38:29.070 --> 00:38:30.510 So that's actually, it's, you know,

710 00:38:30.510 --> 00:38:32.730 when I first started doing this,

711 00:38:32.730 --> 00:38:35.460 having a biostatistics and epidemiology background,

712 00:38:35.460 --> 00:38:37.831 it's kind of shocking to think that you could propose

713 00:38:37.831 --> 00:38:41.621 a big study like this and not even have a health outcome,

714 00:38:41.621 --> 00:38:44.730 just be studying an implementation outcome.

715 00:38:44.730 --> 00:38:48.663 But you come to realize that's really what we need

716 00:38:48.663 --> 00:38:50.250 for the most part.

717 00:38:50.250 --> 00:38:52.380 And if it's possible to also look at the health

718 00:38:52.380 --> 00:38:55.320 outcome without slowing down the trial,

719 00:38:55.320 --> 00:38:58.590 increasing the expenses greatly, it's a great thing to do.

720 00:38:58.590 --> 00:39:01.290 And later on I'll talk about hybrid designs.

721 00:39:01.290 --> 00:39:03.900 But now we're gonna talk about

722 00:39:03.900 --> 00:39:07.320 stepped-wedge cluster-randomized control trials.

723 00:39:07.320 --> 00:39:11.040 So stepped wedge designs are popular

724 00:39:11.040 --> 00:39:12.810 for a number of reasons.

725 00:39:12.810 --> 00:39:16.047 So let me just explain what this schematic diagram means.

726 00:39:16.047 --> 00:39:21.047 So what happens in this particular case is the rows

727 00:39:21.810 --> 00:39:25.690 are clusters, so we have,

728 00:39:25.690 --> 00:39:29.010 or they could be groups of clusters, actually.

729 00:39:29.010 --> 00:39:31.683 And here there are five groups of clusters.

730 00:39:32.790 --> 00:39:34.933 The columns are time points.

731 00:39:34.933 --> 00:39:39.630 So what happens, let's just look at this first row.

732 00:39:39.630 --> 00:39:43.770 So this row, this group one, so there could be one village,

733 00:39:43.770 --> 00:39:45.647 say, that's in this group or there could be five

734 00:39:45.647 --> 00:39:47.550 villages in this group,

735 00:39:47.550 --> 00:39:50.520 but they were randomly assigned to pattern one.

736 00:39:50.520 --> 00:39:54.090 And what that means is that those villages assigned

737 00:39:54.090 --> 00:39:57.813 to pattern one, we take baseline data for everybody,

738 00:39:58.920 --> 00:40:03.030 but then at time two, which could be in six months, a year,

739 00:40:03.030 --> 00:40:05.700 two years, it's often, in my experience,

740 00:40:05.700 --> 00:40:08.073 something like four months, six months,

741 00:40:09.411 --> 00:40:13.350 all the clusters randomly assigned to pattern

742 00:40:13.350 --> 00:40:16.740 one transition to the intervention.

743 00:40:16.740 --> 00:40:19.980 And then for the next 1, 2, 3, 5 periods,

744 00:40:19.980 --> 00:40:22.110 they're in the intervention group.

745 00:40:22.110 --> 00:40:25.863 Then those clusters assigned to pattern two,

746 00:40:25.863 --> 00:40:30.630 they stay on control for two time periods and then

747 00:40:30.630 --> 00:40:32.010 it's at time three,

748 00:40:32.010 --> 00:40:35.430 at time step three they go onto the intervention group

749 00:40:35.430 --> 00:40:36.270 and so forth.

750 00:40:36.270 --> 00:40:40.743 And so what you notice is we have baseline date on everybody

751 00:40:43.500 --> 00:40:46.650 and then at the end of the study we also have,

752 00:40:46.650 --> 00:40:49.304 every cluster and every individual

753 00:40:49.304 --> 00:40:53.400 within those clusters are assigned to the intervention.

754 00:40:53.400 --> 00:40:55.560 So two things happen.

755 00:40:55.560 --> 00:40:59.670 One is that oftentimes in implementation science,

756 00:40:59.670 --> 00:41:02.124 we're studying evidence-based interventions.

757 00:41:02.124 --> 00:41:03.510 So you could say,

758 00:41:03.510 --> 00:41:06.556 how could we withhold having well-trained community

759 00:41:06.556 --> 00:41:08.568 health workers from anybody?

760 00:41:08.568 --> 00:41:10.923 Well, you know,

761 00:41:11.970 --> 00:41:15.160 that's not necessarily an optimal thing to do, but

762 00:41:16.080 --> 00:41:20.700 a sort of compromise is that by the end of this study,

763 00:41:20.700 --> 00:41:23.430 all women living in all of the wards,

764 00:41:23.430 --> 00:41:26.100 if it had been a stepped wedge design, which it wasn't,

765 00:41:26.100 --> 00:41:28.770 would have access to this enhanced community health

766 00:41:28.770 --> 00:41:31.620 worker intervention, all the facilities would be

767 00:41:31.620 --> 00:41:35.040 trained to this new evidence-based intervention.

768 00:41:35.040 --> 00:41:40.040 So it addresses some of the ethical issues that might

769 00:41:40.680 --> 00:41:42.990 come up in implementation science

770 00:41:42.990 --> 00:41:46.143 when we're studying evidence-based interventions.

771 00:41:47.640 --> 00:41:51.030 What's in equipoise is not whether the intervention

772 00:41:51.030 --> 00:41:51.870 works or not,

773 00:41:51.870 --> 00:41:55.565 what's in equipoise is whether this implementation

774 00:41:55.565 --> 00:41:58.599 of the evidence-based intervention will work.

775 00:41:58.599 --> 00:42:03.450 So it's a little bit of a subtle difference

776 00:42:03.450 --> 00:42:06.540 from an ethical point of view and it's also why people

777 00:42:06.540 --> 00:42:08.777 are discussing and writing about new ethics

778 00:42:08.777 --> 00:42:11.130 for public health.

779 00:42:11.130 --> 00:42:14.520 And then the other thing that I wanna point

780 00:42:14.520 --> 00:42:17.042 out about stepped wedge designs that make it very,

781 00:42:17.042 --> 00:42:21.000 make them very rigorous from a causal inference point

782 00:42:21.000 --> 00:42:24.133 of view is that at each time point,

783 00:42:24.133 --> 00:42:26.940 which clusters and then which individuals

784 00:42:26.940 --> 00:42:30.480 within the clusters are in the intervention group or not,

785 00:42:30.480 --> 00:42:32.880 is completely randomly assigned.

786 00:42:32.880 --> 00:42:36.930 So when you contrast time two, these four to this one,

787 00:42:36.930 --> 00:42:38.640 it's a random contrast.

788 00:42:38.640 --> 00:42:40.039 And then time three,

789 00:42:40.039 --> 00:42:44.021 these three to these two is a random contrast and so forth.

790 00:42:44.021 --> 00:42:48.810 So between clusters at any given time point we have

791 00:42:48.810 --> 00:42:51.060 this fully randomized design.

792 00:42:51.060 --> 00:42:56.060 And then what we also have is this element of pre-post,

793 00:42:56.220 --> 00:42:59.760 because, say, we could,

794 00:42:59.760 --> 00:43:02.820 even with just this first row,

795 00:43:02.820 --> 00:43:05.250 we could estimate and test the effect

796 00:43:05.250 --> 00:43:08.880 of the intervention because we have at time one all

797 00:43:08.880 --> 00:43:12.660 of the villages or clusters assigned to time one are

798 00:43:12.660 --> 00:43:15.630 not in the intervention group and then we have

799 00:43:15.630 --> 00:43:17.700 five periods where they were

800 00:43:17.700 --> 00:43:20.133 and the before/after can be compared.

801 00:43:21.270 --> 00:43:22.290 And so what we worry

802 00:43:22.290 --> 00:43:24.360 about with the before/after design

803 00:43:24.360 --> 00:43:26.790 and why it's called quasi-experimental rather

804 00:43:26.790 --> 00:43:29.640 than experimental is because there's one other

805 00:43:29.640 --> 00:43:33.930 thing that's changing, if it's the same villages

806 00:43:33.930 --> 00:43:37.720 clusters and people or comparable people

807 00:43:39.420 --> 00:43:42.330 in this one row of all the clusters assigned

808 00:43:42.330 --> 00:43:44.212 to this row at this one time,

809 00:43:44.212 --> 00:43:47.404 they should be the same with respect to all time

810 00:43:47.404 --> 00:43:49.069 and variant confounders.

811 00:43:49.069 --> 00:43:51.410 But time is happening here,

812 00:43:51.410 --> 00:43:54.067 so there could be no intervention effect,

813 00:43:54.067 --> 00:43:57.347 but let's say between time one and time two,

814 00:43:57.347 --> 00:43:59.640 something else happened in the background like

815 00:43:59.640 --> 00:44:02.545 the government instituted a new program or some new

816 00:44:02.545 --> 00:44:05.140 drug became widely available

817 00:44:06.090 --> 00:44:09.120 or there is a natural disaster.

818 00:44:09.120 --> 00:44:11.190 So then comparing

819 00:44:11.190 --> 00:44:15.540 the before/after within the same clusters will be

820 00:44:15.540 --> 00:44:18.177 biased by these time varying effects.

821 00:44:18.177 --> 00:44:23.177 And so without these contemporaneous clusters happening

822 00:44:23.310 --> 00:44:27.030 at the same time, we can't control for those effects.

823 00:44:27.030 --> 00:44:30.177 So it's almost like an enhanced pre-post design

824 00:44:30.177 --> 00:44:33.442 where we're controlling for time varying effects

825 00:44:33.442 --> 00:44:37.053 through randomized contrasts.

826 00:44:38.160 --> 00:44:40.143 So it's a very strong design,

827 00:44:41.880 --> 00:44:43.793 and here's a good paper to read if you wanna learn

828 00:44:43.793 --> 00:44:46.503 about it a little bit more.

829 00:44:48.390 --> 00:44:53.310 Now I'm gonna give an example of a study I worked on

830 00:44:53.310 --> 00:44:56.340 that was a stepped wedge design.

831 00:44:56.340 --> 00:45:00.000 It was called early access or it studied early access

832 00:45:00.000 --> 00:45:04.122 to ART in what's now called Eswatini, Swaziland.

833 00:45:04.122 --> 00:45:06.960 Its primary funder was

834 00:45:06.960 --> 00:45:09.090 the Clinton Health Access Initiative.

835 00:45:09.090 --> 00:45:11.250 Other funding sources were brought

836 00:45:11.250 --> 00:45:15.000 in, the Dutch Lottery and some other sources.

837 00:45:15.000 --> 00:45:18.480 And what we were looking at here was the impact

838 00:45:18.480 --> 00:45:22.320 of early initiation of ART versus national standard

839 00:45:22.320 --> 00:45:26.330 of care of antiretroviral therapy in Swaziland's

840 00:45:26.330 --> 00:45:28.737 public health sector system.

841 00:45:28.737 --> 00:45:31.230 And it's called the MaxART study.

842 00:45:31.230 --> 00:45:35.220 So what made this study a little bit different

843 00:45:35.220 --> 00:45:37.497 than the studies of the other big trials

844 00:45:37.497 --> 00:45:39.651 of early initiation or early access

845 00:45:39.651 --> 00:45:43.890 to ART that were happening around the same time was

846 00:45:43.890 --> 00:45:46.920 that we were looking at the impact not

847 00:45:46.920 --> 00:45:50.532 of controlling community HIV incidents,

848 00:45:50.532 --> 00:45:53.280 but we were actually looking at the impact of early

849 00:45:53.280 --> 00:45:56.280 access to ART on the clients themselves,

850 00:45:56.280 --> 00:46:01.280 the HIV positive participants who would under standard

851 00:46:02.460 --> 00:46:06.990 of care not be initiated to ART until later on

852 00:46:06.990 --> 00:46:08.910 in the development of their disease,

853 00:46:08.910 --> 00:46:12.330 when they started to develop different types of symptoms,

854 00:46:12.330 --> 00:46:14.356 which I know many people on this call would be familiar

855 00:46:14.356 --> 00:46:17.545 to when CD4 is dropped below 250 and then it was

856 00:46:17.545 --> 00:46:21.480 changed to 500 and so forth or certain symptoms

857 00:46:21.480 --> 00:46:23.430 and AIDS-defining conditions developed,

858 00:46:23.430 --> 00:46:25.560 that was the standard for many,

859 00:46:25.560 --> 00:46:29.160 many years until early access to ART happened.

860 00:46:29.160 --> 00:46:33.675 And it really wasn't known what the impact would be

861 00:46:33.675 --> 00:46:38.033 of early access on HIV positive people themselves,

862 00:46:38.033 --> 00:46:41.070 both in terms of their health outcomes as well

863 00:46:41.070 --> 00:46:44.700 as even more implementation type outcomes such

864 00:46:44.700 --> 00:46:47.550 as retention in care and this issue of, say,

865 00:46:47.550 --> 00:46:50.696 developing resistance if people are being initiated

866 00:46:50.696 --> 00:46:53.910 very early on when they're not showing any signs

867 00:46:53.910 --> 00:46:55.394 of illness and so forth.

868 00:46:55.394 --> 00:46:58.561 So again, because I think partially both

869 00:46:58.561 --> 00:47:01.304 for logistical reasons, which is another reason

870 00:47:01.304 --> 00:47:03.383 why we like stepped wedge designs,

871 00:47:03.383 --> 00:47:07.620 it was as Swaziland, Eswatini didn't have early access

872 00:47:07.620 --> 00:47:09.930 to ART when the study started.

873 00:47:09.930 --> 00:47:13.830 And so to train the providers to do this,

874 00:47:13.830 --> 00:47:17.591 to get the medications in at the scale and volume

875 00:47:17.591 --> 00:47:21.397 that was needed, to have the testing facilities scaled

876 00:47:21.397 --> 00:47:23.010 up and so forth,

877 00:47:23.010 --> 00:47:26.520 it wasn't possible to do that all and be ready

878 00:47:26.520 --> 00:47:30.780 on August 14th when the study started here.

879 00:47:30.780 --> 00:47:33.900 So by phasing it in, it made it possible.

880 00:47:33.900 --> 00:47:36.960 We randomly, in this case there were 14

881 00:47:36.960 --> 00:47:39.570 facilities included, so two in each one

882 00:47:39.570 --> 00:47:43.881 of these clusters and we were,

883 00:47:43.881 --> 00:47:46.740 randomly rolled them in to early access,

884 00:47:46.740 --> 00:47:50.250 giving us time to properly set up each pair

885 00:47:50.250 --> 00:47:53.309 of facilities to be able to implement early access

886 00:47:53.309 --> 00:47:55.260 in a high quality manner.

887 00:47:55.260 --> 00:47:56.475 And then, of course, at the end,

888 00:47:56.475 --> 00:47:59.670 all the facilities were in early access.

889 00:47:59.670 --> 00:48:02.400 And in fact, what I didn't mention,

890 00:48:02.400 --> 00:48:05.790 I mentioned this early on about like this was a high grade,

891 00:48:05.790 --> 00:48:07.500 you know, research quality study,

892 00:48:07.500 --> 00:48:10.500 there were extra resources put in and so forth,

893 00:48:10.500 --> 00:48:12.300 and somewhere in the middle of this,

894 00:48:13.160 --> 00:48:17.010 WHO decided everybody should have early access

895 00:48:17.010 --> 00:48:20.292 and Eswatini immediately adopted that recommendation

896 00:48:20.292 --> 00:48:22.410 and that was the end of the standard of care

897 00:48:22.410 --> 00:48:23.374 we were studying.

898 00:48:23.374 --> 00:48:27.449 So our power was compromised, not fully, luckily,

899 00:48:27.449 --> 00:48:31.380 but that's, this issue that I'm mentioning,

900 00:48:31.380 --> 00:48:33.990 that rapid is just such an important aspect

901 00:48:33.990 --> 00:48:38.040 in implementation science, I think it's an area of,

902 00:48:38.040 --> 00:48:39.360 you know, sort of research.

903 00:48:39.360 --> 00:48:41.730 We need good examples as well as possibly

904 00:48:41.730 --> 00:48:44.366 new methodologies of moving these studies

905 00:48:44.366 --> 00:48:49.350 along so that the policy, when policies are being made,

906 00:48:49.350 --> 00:48:51.390 the policymakers would actually have data

907 00:48:51.390 --> 00:48:54.990 from studies like this to inform their decision making,

908 00:48:54.990 --> 00:48:56.643 which wasn't the case here.

909 00:48:57.900 --> 00:49:00.240 So here is a published paper on the protocol

910 00:49:00.240 --> 00:49:02.190 if you wanted to learn a little bit more

911 00:49:02.190 --> 00:49:04.083 about the design of this study.

912 00:49:06.120 --> 00:49:07.680 And then the results.

913 00:49:07.680 --> 00:49:09.610 So this study was conducted

914 00:49:10.470 --> 00:49:13.047 between 2014 and 2017,

915 00:49:13.047 --> 00:49:16.893 3,405 participants were enrolled.

916 00:49:17.910 --> 00:49:22.910 And the 12 month HIV care retention rates were 80% and 86%.

917 00:49:24.930 --> 00:49:27.030 So there was a, you know, it was an improvement,

918 00:49:27.030 --> 00:49:31.560 6% retention means alive and remaining in care.

919 00:49:31.560 --> 00:49:36.450 So it's a comprehensive outcome that both includes sort

920 00:49:36.450 --> 00:49:39.900 of the implementation aspect of not losing people

921 00:49:39.900 --> 00:49:42.180 for coming in, getting their medications,

922 00:49:42.180 --> 00:49:44.670 being checked to make sure their disease isn't

923 00:49:44.670 --> 00:49:47.340 advancing and then also their health outcome,

924 00:49:47.340 --> 00:49:48.960 making sure they're still alive.

925 00:49:48.960 --> 00:49:53.610 So again, 80% to 86%, it's not huge, but it's still,

926 00:49:53.610 --> 00:49:55.350 you know, a nice improvement.

927 00:49:55.350 --> 00:49:58.380 And then the 12 month combined retention

928 00:49:58.380 --> 00:50:03.380 and viral suppression endpoint rates were 44% versus 80%.

929 00:50:04.500 --> 00:50:06.180 So that's very, very big.

930 00:50:06.180 --> 00:50:07.560 And you know, as we all know,

931 00:50:07.560 --> 00:50:10.020 getting people in ART really improves

932 00:50:10.020 --> 00:50:11.278 viral suppression rates.

933 00:50:11.278 --> 00:50:14.040 So that was shown to be very beneficial

934 00:50:14.040 --> 00:50:15.602 and highly significant.

935 00:50:15.602 --> 00:50:20.602 So we've considered this to be good news in terms

936 00:50:20.640 --> 00:50:24.900 of early access to ART also being strongly beneficial

937 00:50:24.900 --> 00:50:29.130 to the clients themselves, not just society as a whole.

938 00:50:29.130 --> 00:50:31.163 And at the same time we noticed

939 00:50:31.163 --> 00:50:33.690 that there were significant gaps

940 00:50:33.690 --> 00:50:36.750 in the healthcare system's ability to provide viral

941 00:50:36.750 --> 00:50:41.750 load monitoring with 80% participants in standard

942 00:50:42.090 --> 00:50:45.900 of care and 60% in early access each having

943 00:50:45.900 --> 00:50:48.060 a missing viral load.

944 00:50:48.060 --> 00:50:50.385 So that's an example of a stepped-wedge

945 00:50:50.385 --> 00:50:53.846 cluster-randomized design that both was looking at kind

946 00:50:53.846 --> 00:50:57.360 of a combined implementation health outcome

947 00:50:57.360 --> 00:50:59.013 as its primary outcome.

948 00:51:02.520 --> 00:51:05.505 Okay, I think I'm gonna, well, all right,

949 00:51:05.505 --> 00:51:10.505 so a little bit about, I wonder, I'm sorry,

950 00:51:11.070 --> 00:51:13.980 I just thought maybe I can get rid of this.

951 00:51:13.980 --> 00:51:16.530 Oh, okay, now I got rid of all these drawings, sorry,

952 00:51:16.530 --> 00:51:19.080 there were all these colored pencil things on here.

953 00:51:20.346 --> 00:51:24.300 Stepped wedge designs, when are they useful?

954 00:51:24.300 --> 00:51:27.060 When there's evidence to support of the intervention

955 00:51:27.060 --> 00:51:29.730 or resistance to a parallel design where only

956 00:51:29.730 --> 00:51:31.860 half received the treatment.

957 00:51:31.860 --> 00:51:34.350 Another aspect of stepped wedge designs

958 00:51:34.350 --> 00:51:36.930 it's often believed, and this is on the ethical side,

959 00:51:36.930 --> 00:51:40.470 that the treatment is service delivery or policy change.

960 00:51:40.470 --> 00:51:41.940 And that it's often believed

961 00:51:41.940 --> 00:51:45.540 that when what's being studied is a service delivery

962 00:51:45.540 --> 00:51:47.190 issue or policy change,

963 00:51:47.190 --> 00:51:50.640 we don't need individual informed consent.

964 00:51:50.640 --> 00:51:55.002 And then when the intra-cluster correlation is high

965 00:51:55.002 --> 00:51:57.030 or the cluster size is high.

966 00:51:57.030 --> 00:51:59.970 So I haven't talked about the inter cluster correlation,

967 00:51:59.970 --> 00:52:03.330 but that's a very important input parameter

968 00:52:03.330 --> 00:52:06.630 when we look at cluster-randomized designs.

969 00:52:06.630 --> 00:52:10.530 And what that measures, we obviously call it

970 00:52:10.530 --> 00:52:12.990 the ICC or sometimes you'll see it indicated

971 00:52:12.990 --> 00:52:17.310 by the Greek letter rho is that it tells us

972 00:52:17.310 --> 00:52:20.820 how highly correlated the outcome is,

973 00:52:20.820 --> 00:52:22.419 particularly the primary outcome

974 00:52:22.419 --> 00:52:25.655 within the clusters compared to between the clusters.

975 00:52:25.655 --> 00:52:29.462 So, let's say, if we were, let's say,

976 00:52:29.462 --> 00:52:34.462 in the MaxART study in Eswatini, if certain facilities,

977 00:52:34.861 --> 00:52:38.100 let's say, had very high mortality rates and then

978 00:52:38.100 --> 00:52:41.160 other facilities, you know at baseline had low

979 00:52:41.160 --> 00:52:44.460 mortality rates, that would suggest a high ICC.

980 00:52:44.460 --> 00:52:48.120 And when you have a high ICC, a lot of variability

981 00:52:48.120 --> 00:52:53.120 in the event rate between clusters, you lose power,

982 00:52:53.180 --> 00:52:55.500 in a standard cluster-randomized trial,

983 00:52:55.500 --> 00:52:57.350 you lose a lot of power.

984 00:52:57.350 --> 00:52:59.220 It's dramatic.

985 00:52:59.220 --> 00:53:02.370 In fact, the ICC like any other correlation

986 00:53:02.370 --> 00:53:05.755 coefficient ranges from zero to one and when it's one

987 00:53:05.755 --> 00:53:10.080 that means that the only variation is between facilities,

988 00:53:10.080 --> 00:53:11.040 there's a, you know,

989 00:53:11.040 --> 00:53:14.183 no variation between individuals within a facility,

990 00:53:14.183 --> 00:53:16.740 then your sample, your effective sample size

991 00:53:16.740 --> 00:53:19.140 is essentially the number of facilities, say,

992 00:53:19.140 --> 00:53:22.534 14 in MaxART, compared to, say,

993 00:53:22.534 --> 00:53:26.733 3,205, which would be the effective sample size

994 00:53:26.733 --> 00:53:30.307 if there was no variation in the event rates

995 00:53:30.307 --> 00:53:33.136 between facilities and all the variation was

996 00:53:33.136 --> 00:53:35.280 just between clients.

997 00:53:35.280 --> 00:53:38.070 So when the ICC is high,

998 00:53:38.070 --> 00:53:41.523 you're gonna need a lot of clusters to get power

999 00:53:41.523 --> 00:53:43.620 in a cluster-randomized trial.

1000 00:53:43.620 --> 00:53:45.720 Whereas in a stepped wedge design,

1001 00:53:45.720 --> 00:53:47.640 because of the feature that I showed you,

1002 00:53:47.640 --> 00:53:51.576 that stepped wedge designs completely exploit

1003 00:53:51.576 --> 00:53:55.230 the within facility contrast,

1004 00:53:55.230 --> 00:53:58.072 the pre-post contrast within facilities,

1005 00:53:58.072 --> 00:54:02.423 you lose very little power when you have a high ICC.

1006 00:54:02.423 --> 00:54:05.100 So it's a feasible way of running

1007 00:54:05.100 --> 00:54:07.380 a cluster-randomized trial when there's a lot

1008 00:54:07.380 --> 00:54:10.050 of heterogeneity between the groups.

1009 00:54:10.050 --> 00:54:12.150 And then of course because of that it can be

1010 00:54:12.150 --> 00:54:14.853 more efficient over the parallel design.

1011 00:54:16.290 --> 00:54:20.610 I'm gonna skip this point about why there might be caution,

1012 00:54:20.610 --> 00:54:25.380 but one caution is this piece about clusters not

1013 00:54:25.380 --> 00:54:27.731 being able to follow the randomization schedule.

1014 00:54:27.731 --> 00:54:30.000 So, you know, we can say okay,

1015 00:54:30.000 --> 00:54:32.199 you start at time two and you start at time three

1016 00:54:32.199 --> 00:54:33.160 and so forth.

1017 00:54:33.160 --> 00:54:35.441 But, you know, we're talking about pragmatic

1018 00:54:35.441 --> 00:54:39.870 trials embedded often within public health systems,

1019 00:54:39.870 --> 00:54:43.470 and there's other things that come up, maybe

1020 00:54:43.470 --> 00:54:45.925 some issues have come up, some people have left,

1021 00:54:45.925 --> 00:54:48.240 it's just not possible to start at time two,

1022 00:54:48.240 --> 00:54:51.150 they have to start at time three and that sort of thing.

1023 00:54:51.150 --> 00:54:56.150 And then once the random patterns start to be violated,

1024 00:54:57.330 --> 00:55:00.180 then you no longer have the strength

1025 00:55:00.180 --> 00:55:02.407 of the causal inference from the randomization

1026 00:55:02.407 --> 00:55:05.460 and it becomes more like an observational study,

1027 00:55:05.460 --> 00:55:08.220 where the facilities just chose when they were gonna

1028 00:55:08.220 --> 00:55:09.633 start the intervention.

1029 00:55:12.300 --> 00:55:15.783 Okay. So how are we doing on time, Ike?

1030 00:55:19.170 --> 00:55:21.543 <v Speaker>Thank you, Donna, please continue.</v>

1031 00:55:22.410 --> 00:55:26.224 We would like to just have what you have prepared for us.

1032 00:55:26.224 --> 00:55:27.141 I'm sure...

1033 00:55:30.753 --> 00:55:32.523 We still, that's, go on.

1034 00:55:32.523 --> 00:55:35.449 Please, go on. I'm sure we'll be okay.

1035 00:55:35.449 --> 00:55:39.161 We're happy to have you. We're enjoying this.

1036 00:55:39.161 --> 00:55:40.380 <v Presenter>Okay.</v>

1037 00:55:40.380 --> 00:55:44.280 'Cause I tend to underestimate how quickly I can

1038 00:55:44.280 --> 00:55:49.280 get through a talk and I like to, you know,

1039 00:55:49.283 --> 00:55:51.810 enrich it with things that aren't necessarily

1040 00:55:51.810 --> 00:55:54.860 on the slides and then it goes a lot more slowly.

1041 00:55:54.860 --> 00:55:58.037 But just let me know if you feel like I need to wrap up,

1042 00:55:58.037 --> 00:56:00.544 otherwise I'll just keep talking about everything

1043 00:56:00.544 --> 00:56:03.720 I've prepared to discuss today.

1044 00:56:03.720 --> 00:56:05.890 So now we're gonna move from

1045 00:56:07.050 --> 00:56:10.650 experimental studies to quasi-experimental

1046 00:56:10.650 --> 00:56:12.753 and non-experimental studies.

1047 00:56:17.760 --> 00:56:20.703 Next. So observational.

1048 00:56:24.000 --> 00:56:26.670 Okay. Observational study designs.

1049 00:56:26.670 --> 00:56:30.600 So for those of you who have studied biostatistics

1050 00:56:30.600 --> 00:56:34.919 and epidemiology, we know about these very well.

1051 00:56:34.919 --> 00:56:37.560 We're studying and assessing phenomena

1052 00:56:37.560 --> 00:56:39.462 as they occur naturally.

1053 00:56:39.462 --> 00:56:41.610 We can look at policy initiatives.

1054 00:56:41.610 --> 00:56:45.113 It's hard to think about randomizing a policy initiative.

1055 00:56:45.113 --> 00:56:48.062 We're not manipulating.

1056 00:56:48.062 --> 00:56:50.640 Cohort studies can be conducted

1057 00:56:50.640 --> 00:56:54.390 within electronic health records as well

1058 00:56:54.390 --> 00:56:55.323 as cross-sectional studies.

1059 00:56:55.323 --> 00:56:58.200 And of course we don't necessarily need electronic

1060 00:56:58.200 --> 00:57:01.797 health records, but they sure do make it easy to do

1061 00:57:01.797 --> 00:57:06.797 very quick evaluations of interventions

1062 00:57:06.967 --> 00:57:11.940 and implementation strategies as they're occurring

1063 00:57:11.940 --> 00:57:15.060 in the health system in a completely pragmatic manner.

1064 00:57:15.060 --> 00:57:16.916 And then here's a bunch of papers

1065 00:57:16.916 --> 00:57:21.210 in the implementation science literature about the use

1066 00:57:21.210 --> 00:57:23.013 of observational studies.

1067 00:57:28.980 --> 00:57:32.401 And then there's quasi-experimental study designs.

1068 00:57:32.401 --> 00:57:36.570 I listed those out earlier, the before/after design.

1069 00:57:36.570 --> 00:57:39.060 So when we, I just wanted to see

1070 00:57:39.060 --> 00:57:40.740 what I'm gonna do next here.

1071 00:57:40.740 --> 00:57:41.573 Oh yeah, okay.

1072 00:57:44.790 --> 00:57:46.980 The before after design, that would be,

1073 00:57:46.980 --> 00:57:49.680 as I illustrated with the stepped wedge design,

1074 00:57:49.680 --> 00:57:51.975 if we just had one of these rows,

1075 00:57:51.975 --> 00:57:56.975 we could just compare a facility or group of facilities,

1076 00:57:57.261 --> 00:58:00.877 what their outcome rates were at baseline compared

1077 00:58:00.877 --> 00:58:05.040 to what their outcome rates were after a certain lag,

1078 00:58:05.040 --> 00:58:07.710 after the intervention was delivered.

1079 00:58:07.710 --> 00:58:12.710 And because we're comparing clusters to themselves,

1080 00:58:15.270 --> 00:58:19.535 we're controlling for all known and measured risk factors,

1081 00:58:19.535 --> 00:58:23.812 which could be potential confounders that are,

1082 00:58:23.812 --> 00:58:27.870 time and variant through this pre-post design.

1083 00:58:27.870 --> 00:58:30.300 That's why it's called quasi-experimental

1084 00:58:30.300 --> 00:58:33.040 because there's full control of confounding for time

1085 00:58:33.040 --> 00:58:36.052 and variant characteristics in a pre-post design.

1086 00:58:36.052 --> 00:58:39.270 And you know, the individual level analog

1087 00:58:39.270 --> 00:58:42.641 of a pre-post design would be an individual, you know,

1088 00:58:42.641 --> 00:58:46.650 match pair study where we use, say, the paired t test

1089 00:58:46.650 --> 00:58:50.310 to evaluate the results and assess the impact

1090 00:58:50.310 --> 00:58:53.370 of a individually applied intervention.

1091 00:58:53.370 --> 00:58:57.710 And then there are cluster analogs

1092 00:58:57.710 --> 00:58:59.670 to the paired t test

1093 00:58:59.670 --> 00:59:04.170 when we conduct a pre-post or before after design

1094 00:59:04.170 --> 00:59:06.450 in a clustered setting.

1095 00:59:06.450 --> 00:59:09.090 And then the controlled before after design,

1096 00:59:09.090 --> 00:59:10.890 which you might have also heard is the difference

1097 00:59:10.890 --> 00:59:15.890 in difference design is a pre-post design enhanced

1098 00:59:18.060 --> 00:59:21.420 by having other clusters or groups

1099 00:59:21.420 --> 00:59:26.130 for which there's no intervention is applied.

1100 00:59:26.130 --> 00:59:28.994 And so by subtracting the change in the groups

1101 00:59:28.994 --> 00:59:33.110 where no intervention was applied from the change

1102 00:59:33.110 --> 00:59:35.376 in the groups where the intervention was applied,

1103 00:59:35.376 --> 00:59:37.950 we can subtract out all the time invariant

1104 00:59:37.950 --> 00:59:39.690 characteristics as well

1105 00:59:39.690 --> 00:59:42.150 as the time varying characteristics.

1106 00:59:42.150 --> 00:59:46.629 So that's a very nice design, and again,

1107 00:59:46.629 --> 00:59:50.100 doesn't require randomization.

1108 00:59:50.100 --> 00:59:53.261 Then there's interrupted time series designs

1109 00:59:53.261 --> 00:59:55.800 where we look at multiple assessments prior

1110 00:59:55.800 --> 00:59:58.350 to and following introduction of an intervention

1111 00:59:58.350 --> 01:00:01.276 and we might be able to more accurately assess

1112 01:00:01.276 --> 01:00:05.820 the outcomes or behaviors than in a single pre-post design.

1113 01:00:05.820 --> 01:00:09.540 And it's kind of like a interrupted time series

1114 01:00:09.540 --> 01:00:13.770 design where time actually becomes a continuous variable,

1115 01:00:13.770 --> 01:00:17.562 instead of before/after we've got the whole time sequence.

1116 01:00:17.562 --> 01:00:20.430 And I'm gonna illustrate that shortly.

1117 01:00:20.430 --> 01:00:23.040 And then finally there's another quasi-experimental

1118 01:00:23.040 --> 01:00:25.470 design that's been used, again,

1119 01:00:25.470 --> 01:00:28.813 to evaluate public health interventions

1120 01:00:28.813 --> 01:00:32.130 and implementation strategies without having

1121 01:00:32.130 --> 01:00:34.854 to randomize the regression discontinuity design

1122 01:00:34.854 --> 01:00:38.850 where individuals and groups can be considered

1123 01:00:38.850 --> 01:00:42.420 to assign to intervention or control based on some

1124 01:00:42.420 --> 01:00:45.900 a priori score or metric that's kind of independent

1125 01:00:45.900 --> 01:00:47.220 of their outcomes.

1126 01:00:47.220 --> 01:00:49.560 And then it's sort of in a causal inference perspective,

1127 01:00:49.560 --> 01:00:54.360 it's an can be treated as an instrumental variable

1128 01:00:54.360 --> 01:00:56.263 and causal inference can be made.

1129 01:00:56.263 --> 01:00:59.010 And for those of you who are health economists

1130 01:00:59.010 --> 01:01:01.699 on this call or have exposure to this,

1131 01:01:01.699 --> 01:01:06.240 these quasi-experimental designs have been put forward,

1132 01:01:06.240 --> 01:01:08.250 I think they're, putting them forward

1133 01:01:08.250 --> 01:01:12.317 has been led by health economists as opposed to, say,

1134 01:01:12.317 --> 01:01:15.030 biostatisticians and clinical researchers.

1135 01:01:15.030 --> 01:01:18.210 And so it's a way that I think stepped wedge designs

1136 01:01:18.210 --> 01:01:21.849 and cluster-randomized trials kind of gain traction.

1137 01:01:21.849 --> 01:01:24.150 And many of the methodologies were worked

1138 01:01:24.150 --> 01:01:26.820 out in the health sciences,

1139 01:01:26.820 --> 01:01:31.380 and then these quasi-experimental study designs.

1140 01:01:31.380 --> 01:01:34.733 A lot of the literature arose in health economics

1141 01:01:34.733 --> 01:01:38.160 and now has kind of crossed over into clinical

1142 01:01:38.160 --> 01:01:41.523 research and biostatistics and so forth.

1143 01:01:43.110 --> 01:01:46.440 And then here's an article that I can recommend

1144 01:01:46.440 --> 01:01:49.260 that would talk about these quasi-experimental

1145 01:01:49.260 --> 01:01:52.020 designs sort of from a, you know,

1146 01:01:52.020 --> 01:01:54.330 in a way that's very accessible, I think,

1147 01:01:54.330 --> 01:01:55.563 to a large audience.

1148 01:01:57.210 --> 01:02:00.621 So the interrupted time series design is a way

1149 01:02:00.621 --> 01:02:04.920 that you can look at it is through the schematic graphic.

1150 01:02:04.920 --> 01:02:07.470 So it's considered one of the strongest

1151 01:02:07.470 --> 01:02:10.203 quasi-experimental designs and it's increasingly

1152 01:02:10.203 --> 01:02:12.960 advocated for use in the evaluation of health

1153 01:02:12.960 --> 01:02:15.500 system quality improvement interventions,

1154 01:02:15.500 --> 01:02:17.730 when randomization is impossible,

1155 01:02:17.730 --> 01:02:21.390 it can also be used to evaluate other like

1156 01:02:21.390 --> 01:02:25.209 population level changes in health policies.

1157 01:02:25.209 --> 01:02:30.209 So here what we do is we observe an outcome rate.

1158 01:02:30.316 --> 01:02:33.660 You know, it could be, say, HIV incidents rates,

1159 01:02:33.660 --> 01:02:38.333 it could be, say, suicide rates,

1160 01:02:41.400 --> 01:02:42.720 any sort of health outcome

1161 01:02:42.720 --> 01:02:46.680 or even an implementation outcome, maternal mortality,

1162 01:02:46.680 --> 01:02:50.850 under five mortality, you know, any sort of health outcome.

1163 01:02:50.850 --> 01:02:53.670 You know, ideally, usually that's measured at kind

1164 01:02:53.670 --> 01:02:56.580 of more of a population level or even measured...

1165 01:02:56.580 --> 01:02:59.370 And it doesn't have to be measured by everybody like

1166 01:02:59.370 --> 01:03:01.950 say using DSS survey data,

1167 01:03:01.950 --> 01:03:05.047 it can be monitored through sampling techniques

1168 01:03:05.047 --> 01:03:06.776 before the intervention.

1169 01:03:06.776 --> 01:03:11.610 And so we might expect, in this idealized situation,

1170 01:03:11.610 --> 01:03:13.950 we're seeing that before the intervention,

1171 01:03:13.950 --> 01:03:16.154 this outcome rate is stable, there's not getting worse,

1172 01:03:16.154 --> 01:03:17.533 it's not getting better.

1173 01:03:17.533 --> 01:03:18.810 But you could also have,

1174 01:03:18.810 --> 01:03:21.810 it doesn't have to be a flat kind of slope.

1175 01:03:21.810 --> 01:03:23.701 It could be getting worse or better,

1176 01:03:23.701 --> 01:03:25.590 it could go in either direction.

1177 01:03:25.590 --> 01:03:30.256 And then the idea is that when,

1178 01:03:30.256 --> 01:03:32.640 if the intervention didn't happen,

1179 01:03:32.640 --> 01:03:35.250 it would just trot along at the same rate

1180 01:03:35.250 --> 01:03:38.640 that it had prior to the intervention.

1181 01:03:38.640 --> 01:03:40.770 And then when the intervention happens,

1182 01:03:40.770 --> 01:03:44.340 we might think that the rate drops,

1183 01:03:44.340 --> 01:03:46.508 let's say if this was an adverse health effect,

1184 01:03:46.508 --> 01:03:48.900 this would be around the time of the intervention

1185 01:03:48.900 --> 01:03:51.450 and people can also hypothesize lag.

1186 01:03:51.450 --> 01:03:52.950 So maybe it wouldn't be immediate,

1187 01:03:52.950 --> 01:03:56.100 maybe it would be six months later or a year later,

1188 01:03:56.100 --> 01:03:58.320 you'd see a drop in the rate if this was something

1189 01:03:58.320 --> 01:03:59.910 to improve health.

1190 01:03:59.910 --> 01:04:02.232 And then you also might see in addition to the drop

1191 01:04:02.232 --> 01:04:05.130 we might see a change in the slopes

1192 01:04:05.130 --> 01:04:09.197 so that it might continue to improve slowly over time.

1193 01:04:09.197 --> 01:04:11.400 So there could be a trend change.

1194 01:04:11.400 --> 01:04:13.772 It could also happen that there's no drop,

1195 01:04:13.772 --> 01:04:17.217 but that we just see the trend change,

1196 01:04:17.217 --> 01:04:20.809 or there could be a drop and then no further trend change.

1197 01:04:20.809 --> 01:04:23.064 And an interrupted time series design

1198 01:04:23.064 --> 01:04:25.650 at the analysis stage would allow any

1199 01:04:25.650 --> 01:04:27.063 of these possibilities.

1200 01:04:29.490 --> 01:04:31.590 And then with the controlled interrupted time

1201 01:04:31.590 --> 01:04:35.400 series design, we would have other groups that we might

1202 01:04:35.400 --> 01:04:38.310 be observing before the intervention,

1203 01:04:38.310 --> 01:04:40.200 they could be at the same level or a different

1204 01:04:40.200 --> 01:04:43.080 level 'cause what we really care about is around

1205 01:04:43.080 --> 01:04:44.848 the time that the intervention happened,

1206 01:04:44.848 --> 01:04:46.410 we would hope to not,

1207 01:04:46.410 --> 01:04:49.950 if we see any change in them of a drop in the level

1208 01:04:49.950 --> 01:04:51.660 or a change in the slope,

1209 01:04:51.660 --> 01:04:54.360 that we'd subtract that out and not attribute

1210 01:04:54.360 --> 01:04:57.151 that in the group that had the intervention,

1211 01:04:57.151 --> 01:04:59.607 we could attribute that to part of the drop

1212 01:04:59.607 --> 01:05:01.348 and that part of the change in slope

1213 01:05:01.348 --> 01:05:03.507 to these background time effects.

1214 01:05:03.507 --> 01:05:06.390 And so that's why we like the control group.

1215 01:05:06.390 --> 01:05:09.120 And here's an article about if you wanted to learn

1216 01:05:09.120 --> 01:05:12.243 more about interrupted time series in public health.

1217 01:05:15.360 --> 01:05:16.833 So a few examples.

1218 01:05:20.670 --> 01:05:24.071 So here, this was a project that I worked

1219 01:05:24.071 --> 01:05:27.220 on in Mexico, and we were

1220 01:05:28.380 --> 01:05:31.239 thinking about a learning healthcare system

1221 01:05:31.239 --> 01:05:35.590 in Mexico for evaluating

1222 01:05:38.458 --> 01:05:42.420 the performance, in Mexico

1223 01:05:42.420 --> 01:05:45.720 there's something like, I think, 34 states,

1224 01:05:45.720 --> 01:05:47.660 just like the United States we have 50 states,

1225 01:05:47.660 --> 01:05:50.940 so they have 34, and these are the acronyms for each

1226 01:05:50.940 --> 01:05:52.260 of the states.

1227 01:05:52.260 --> 01:05:56.493 And then we use the electronic medical records,

1228 01:05:57.900 --> 01:06:00.840 they're trying to use them for chronic disease prevention,

1229 01:06:00.840 --> 01:06:02.250 screening and care.

1230 01:06:02.250 --> 01:06:05.077 So here there was almost 2 million patients included

1231 01:06:05.077 --> 01:06:08.250 who had at least one clinic visit that included

1232 01:06:08.250 --> 01:06:10.538 a chronic disease diagnosis,

1233 01:06:10.538 --> 01:06:14.070 a chronic disease was defined here as hypertension,

1234 01:06:14.070 --> 01:06:17.460 diabetes, dyslipidemia, or obesity,

1235 01:06:17.460 --> 01:06:21.003 among over 12,000 healthcare facilities.

1236 01:06:22.050 --> 01:06:26.588 And then there was a implementation outcome developed

1237 01:06:26.588 --> 01:06:30.323 that was indexed the quality of care being used

1238 01:06:30.323 --> 01:06:32.460 for the prevention, screening and treatment

1239 01:06:32.460 --> 01:06:35.400 of diabetes that was called ICAD.

1240 01:06:35.400 --> 01:06:38.176 And then that was able, through the health records,

1241 01:06:38.176 --> 01:06:43.176 we were able to score each facility at every month

1242 01:06:43.440 --> 01:06:46.170 during the study period as to how well they were

1243 01:06:46.170 --> 01:06:49.680 doing between June, 2016 and July, 2018

1244 01:06:49.680 --> 01:06:52.890 on their quality of care for the prevention,

1245 01:06:52.890 --> 01:06:55.080 screening and treatment of diabetes.

1246 01:06:55.080 --> 01:06:57.378 And so what we see here is,

1247 01:06:57.378 --> 01:06:59.790 and I apologize 'cause this work was done

1248 01:06:59.790 --> 01:07:02.910 in Mexico, so the graph is in Spanish, but I think

1249 01:07:02.910 --> 01:07:06.960 what you can see graphically is what is the point estimate,

1250 01:07:06.960 --> 01:07:09.930 which is this, the black vertical lines

1251 01:07:09.930 --> 01:07:14.580 is the mean quality of care ICAT index for the state,

1252 01:07:14.580 --> 01:07:17.550 and then the 95% confidence intervals

1253 01:07:17.550 --> 01:07:20.820 for how it varied over the study period.

1254 01:07:20.820 --> 01:07:25.820 And so here actually what happened was that these,

1255 01:07:27.290 --> 01:07:29.550 there were two,

1256 01:07:29.550 --> 01:07:33.420 only two states that actually ended up doing worse.

1257 01:07:33.420 --> 01:07:36.118 And then there were two states that significantly

1258 01:07:36.118 --> 01:07:39.288 worse because the 95% confidence intervals aren't

1259 01:07:39.288 --> 01:07:42.810 touching the null value, which means no change.

1260 01:07:42.810 --> 01:07:44.550 And then there were two states that,

1261 01:07:44.550 --> 01:07:47.730 two additional states or three additional states

1262 01:07:47.730 --> 01:07:50.389 that did worse but not significantly so.

1263 01:07:50.389 --> 01:07:52.290 And then you can see these, you know,

1264 01:07:52.290 --> 01:07:56.507 these are sorted by how well they did on this ICAD score.

1265 01:07:56.507 --> 01:08:01.507 And you can see that there was a huge variation

1266 01:08:03.060 --> 01:08:06.210 in Mexico among these 34 states.

1267 01:08:06.210 --> 01:08:10.320 So then, in addition to seeing like who needs help,

1268 01:08:10.320 --> 01:08:13.710 we can also see that, you know, there's big,

1269 01:08:13.710 --> 01:08:15.750 oftentimes in the United States we talk a lot

1270 01:08:15.750 --> 01:08:20.010 about disparities, but in many other countries

1271 01:08:20.010 --> 01:08:22.260 there are big disparities as well.

1272 01:08:22.260 --> 01:08:23.093 And here's, you know,

1273 01:08:23.093 --> 01:08:26.040 sort of a graphical illustration of how big

1274 01:08:26.040 --> 01:08:28.590 a disparity might be between some of the wealthier,

1275 01:08:28.590 --> 01:08:32.468 more urban, higher SES states and some

1276 01:08:32.468 --> 01:08:34.740 of the poorer, rural states.

1277 01:08:34.740 --> 01:08:38.160 So this is a starting point in terms of documenting

1278 01:08:38.160 --> 01:08:40.140 what are the issues and then we might wanna go

1279 01:08:40.140 --> 01:08:42.570 in and figure out the next steps,

1280 01:08:42.570 --> 01:08:46.050 which we would've liked to have gotten to would be,

1281 01:08:46.050 --> 01:08:48.420 let's say, let's take the top five highest

1282 01:08:48.420 --> 01:08:51.360 performing states, understand what's working

1283 01:08:51.360 --> 01:08:54.538 there at the facility and client and system level

1284 01:08:54.538 --> 01:08:58.830 that they're able to achieve these very high ICAD scores.

1285 01:08:58.830 --> 01:09:01.140 And then what are the barriers to those sorts

1286 01:09:01.140 --> 01:09:04.950 of implementation strategies that are happening in some

1287 01:09:04.950 --> 01:09:08.100 of these states where there's either no improvement

1288 01:09:08.100 --> 01:09:11.310 or things have actually gotten worse.

1289 01:09:11.310 --> 01:09:13.680 And then how can we adapt these implementation

1290 01:09:13.680 --> 01:09:16.931 strategies to create a new intervention that might

1291 01:09:16.931 --> 01:09:20.370 improve chronic disease prevention,

1292 01:09:20.370 --> 01:09:22.920 screening and care in some of these states

1293 01:09:22.920 --> 01:09:25.323 for which these disparities exist.

1294 01:09:29.760 --> 01:09:32.875 And then another example here of a paper

1295 01:09:32.875 --> 01:09:36.360 that I along with others recently published that gives

1296 01:09:36.360 --> 01:09:40.350 an example of a controlled interrupted time series

1297 01:09:40.350 --> 01:09:44.160 is the looking at the causal impact

1298 01:09:44.160 --> 01:09:46.680 of the Affordable Care Act on colorectal cancer

1299 01:09:46.680 --> 01:09:48.450 incidence and mortality.

1300 01:09:48.450 --> 01:09:53.450 So colorectal cancer incidence and mortality are

1301 01:09:53.637 --> 01:09:58.637 one of the biggest causes of cancer cases

1302 01:09:59.610 --> 01:10:01.620 and deaths in the United States.

1303 01:10:01.620 --> 01:10:06.363 And with the changing nutrition epidemiologic transition,

1304 01:10:07.650 --> 01:10:09.900 I think colorectal cancer is understudied

1305 01:10:09.900 --> 01:10:12.630 around the world, but it only stands to reason,

1306 01:10:12.630 --> 01:10:16.380 just as we've seen the increase in rates of other

1307 01:10:16.380 --> 01:10:20.356 chronic diseases such as diabetes and heart disease,

1308 01:10:20.356 --> 01:10:22.425 breast cancer and so forth,

1309 01:10:22.425 --> 01:10:26.130 we'll be seeing soon increases in the incidence

1310 01:10:26.130 --> 01:10:28.800 in mortality of colorectal cancer.

1311 01:10:28.800 --> 01:10:32.610 And it's known we have a efficacious

1312 01:10:32.610 --> 01:10:35.730 evidence-based intervention for colorectal cancer.

1313 01:10:35.730 --> 01:10:39.240 It's called colonoscopy and it involves an examination

1314 01:10:39.240 --> 01:10:43.848 of the colon for polyps and removal of polyps

1315 01:10:43.848 --> 01:10:46.540 before they have an opportunity to develop

1316 01:10:46.540 --> 01:10:50.400 into pre-cancerous and cancerous lesions.

1317 01:10:50.400 --> 01:10:55.080 And it's been found to be at least 50% efficacious

1318 01:10:55.080 --> 01:10:57.120 in randomized trials.

1319 01:10:57.120 --> 01:10:59.880 It's also expensive, in the United States it costs

1320 01:10:59.880 --> 01:11:03.510 at least $3,000 per colonoscopy screening.

1321 01:11:03.510 --> 01:11:06.296 So many Americans were not able

1322 01:11:06.296 --> 01:11:09.090 to afford colonoscopy screening.

1323 01:11:09.090 --> 01:11:11.700 And when President Obama brought

1324 01:11:11.700 --> 01:11:13.650 in the Affordable Care Act, it's also called

1325 01:11:13.650 --> 01:11:17.850 Obamacare, one of the main tenets that it brought in,

1326 01:11:17.850 --> 01:11:20.340 which people in the public health community really

1327 01:11:20.340 --> 01:11:24.210 liked is that it guaranteed funding

1328 01:11:24.210 --> 01:11:28.404 for evidence-based preventive interventions.

1329 01:11:28.404 --> 01:11:31.710 And colonoscopy was among those and maybe among

1330 01:11:31.710 --> 01:11:33.270 the most important.

1331 01:11:33.270 --> 01:11:36.464 So here's a perfect example where we can study

1332 01:11:36.464 --> 01:11:40.080 the impact of the Affordable Care Act on colorectal

1333 01:11:40.080 --> 01:11:41.670 cancer incidence and mortality.

1334 01:11:41.670 --> 01:11:45.480 Well, we know from these trials that if people

1335 01:11:45.480 --> 01:11:48.300 manage to get colonoscopies, their rates, you know,

1336 01:11:48.300 --> 01:11:52.800 on the population level will go down by around 50% or more,

1337 01:11:52.800 --> 01:11:56.280 but can, by just simply changing the law,

1338 01:11:56.280 --> 01:11:57.510 if you think of the cascade,

1339 01:11:57.510 --> 01:11:59.610 there's so many steps that have to happen

1340 01:11:59.610 --> 01:12:03.120 before people might actually get these colonoscopies

1341 01:12:03.120 --> 01:12:06.210 and get them on the recommended schedule and then see

1342 01:12:06.210 --> 01:12:10.680 the impact on reduction in colorectal cancer and incidence.

1343 01:12:10.680 --> 01:12:15.680 So what we did was we were able to, through,

1344 01:12:15.930 --> 01:12:17.710 we have a very big health system

1345 01:12:18.690 --> 01:12:21.150 in the western part of the United States called

1346 01:12:21.150 --> 01:12:23.190 the Kaiser Permanente system,

1347 01:12:23.190 --> 01:12:25.410 and then they're divided into kind of subgroups.

1348 01:12:25.410 --> 01:12:27.090 So I had colleagues

1349 01:12:27.090 --> 01:12:30.390 at Kaiser Permanente in Northern California.

1350 01:12:30.390 --> 01:12:32.550 It's an integrated healthcare delivery system.

1351 01:12:32.550 --> 01:12:35.152 It's a private system with over 4 million members

1352 01:12:35.152 --> 01:12:38.790 who are representative of the regional population.

1353 01:12:38.790 --> 01:12:40.393 And so we used an open cohort

1354 01:12:40.393 --> 01:12:44.280 of Kaiser Permanente of Northern California members

1355 01:12:44.280 --> 01:12:47.527 who were 50 years or older between January 1st, 2000

1356 01:12:47.527 --> 01:12:50.400 and Decembsr 31st, 2017.

1357 01:12:50.400 --> 01:12:53.551 So there were over 1 million such individuals

1358 01:12:53.551 --> 01:12:57.038 who were part of the study population at some points

1359 01:12:57.038 --> 01:12:59.760 in time over this period.

1360 01:12:59.760 --> 01:13:04.380 And with around 220 million person months of follow up.

1361 01:13:04.380 --> 01:13:05.734 And during that time,

1362 01:13:05.734 --> 01:13:10.693 there were almost 20,000 colorectal cancer cases occurred,

1363 01:13:10.693 --> 01:13:15.693 and over 2,600 people died of colorectal cancer.

1364 01:13:16.572 --> 01:13:19.893 So that's basically the study population here.

1365 01:13:22.683 --> 01:13:26.670 And then here is our interrupted time series design.

1366 01:13:26.670 --> 01:13:29.700 So it wasn't a controlled time series design,

1367 01:13:29.700 --> 01:13:34.109 but what we saw is, so this is colorectal cancer incidence

1368 01:13:34.109 --> 01:13:37.710 and, on the Y axis,

1369 01:13:37.710 --> 01:13:40.740 so it's how many cases per hundred thousand were

1370 01:13:40.740 --> 01:13:43.080 occurring in the study population.

1371 01:13:43.080 --> 01:13:44.820 And then here's the red line.

1372 01:13:44.820 --> 01:13:47.040 That's when the ACA, the Affordable Care Act was

1373 01:13:47.040 --> 01:13:48.657 rolled into public policy.

1374 01:13:48.657 --> 01:13:50.515 And then here's the after data.

1375 01:13:50.515 --> 01:13:54.600 And what we're seeing, and then these, the very,

1376 01:13:54.600 --> 01:13:57.600 very jagged lines are the natural variation

1377 01:13:57.600 --> 01:14:00.570 in the monthly rates, which is the kind of thing we see,

1378 01:14:00.570 --> 01:14:02.430 statistical random variation.

1379 01:14:02.430 --> 01:14:05.370 We don't see smooth curves when we look at rates

1380 01:14:05.370 --> 01:14:08.010 on a very fine scale like this,

1381 01:14:08.010 --> 01:14:10.260 they're kind of going up and down.

1382 01:14:10.260 --> 01:14:13.972 And then the red line kind of smooths these curves

1383 01:14:13.972 --> 01:14:16.980 without testing any particular hypothesis.

1384 01:14:16.980 --> 01:14:19.140 But we see that, you know,

1385 01:14:19.140 --> 01:14:22.045 the rate before the Affordable Care Act came in,

1386 01:14:22.045 --> 01:14:26.940 it was kind of fluctuating up and down a little bit.

1387 01:14:26.940 --> 01:14:29.327 It's not that, when I showed you that earlier slide

1388 01:14:29.327 --> 01:14:32.730 of the sort of schematic of an interrupted time

1389 01:14:32.730 --> 01:14:35.250 series design, there was just a straight line

1390 01:14:35.250 --> 01:14:36.990 going through here, it's not quite that,

1391 01:14:36.990 --> 01:14:38.520 this is real-life data,

1392 01:14:38.520 --> 01:14:41.400 but that we do see after the AC came in,

1393 01:14:41.400 --> 01:14:44.850 even just, you know, not imposing any structure on the model

1394 01:14:44.850 --> 01:14:47.340 that we see that the colorectal cancer

1395 01:14:47.340 --> 01:14:49.523 incidence went down fairly quickly.

1396 01:14:49.523 --> 01:14:51.390 And you might wonder why.

1397 01:14:51.390 --> 01:14:54.462 Well, they take out these polyps that are

1398 01:14:54.462 --> 01:14:57.600 pre-cancerous and you don't get cancer.

1399 01:14:57.600 --> 01:14:59.553 So it can happen very quickly.

1400 01:15:00.750 --> 01:15:03.060 And then what we did was then we fit

1401 01:15:03.060 --> 01:15:07.044 that classic interrupted time series model to the data.

1402 01:15:07.044 --> 01:15:08.340 And so what we saw,

1403 01:15:08.340 --> 01:15:10.440 that's this line here where you can see

1404 01:15:10.440 --> 01:15:13.410 that what was happening was colorectal cancer actually

1405 01:15:13.410 --> 01:15:16.478 in the background is slowly going up a little bit

1406 01:15:16.478 --> 01:15:18.813 in this part of the country and probably everywhere

1407 01:15:18.813 --> 01:15:20.313 in the United States.

1408 01:15:20.313 --> 01:15:22.519 But then ACA came in, we actually,

1409 01:15:22.519 --> 01:15:24.813 I mean we couldn't believe it, you know, there was this,

1410 01:15:24.813 --> 01:15:29.280 we saw this drop and then just like in the classic design,

1411 01:15:29.280 --> 01:15:30.586 and this was significant,

1412 01:15:30.586 --> 01:15:35.586 and then we saw this continued slower decrease in trend.

1413 01:15:37.260 --> 01:15:39.450 So right, it was at this point that everyone

1414 01:15:39.450 --> 01:15:42.443 in Kaiser Permanente was able to get access

1415 01:15:42.443 --> 01:15:46.445 to colonoscopies, and so it lowered the rates right

1416 01:15:46.445 --> 01:15:49.473 away and then the rates continued to decline.

1417 01:15:50.850 --> 01:15:52.510 So that's an example of

1418 01:15:53.747 --> 01:15:57.070 an interrupted time series design to study

1419 01:15:57.917 --> 01:16:00.870 the implementation of an evidence-based intervention

1420 01:16:00.870 --> 01:16:02.370 at the policy level,

1421 01:16:02.370 --> 01:16:04.653 namely through the Affordable Care Act.

1422 01:16:07.350 --> 01:16:10.320 And here are the co-authors,

1423 01:16:10.320 --> 01:16:12.153 and then here's the publication.

1424 01:16:16.200 --> 01:16:18.630 So now I'm gonna talk a little bit more about some

1425 01:16:18.630 --> 01:16:21.870 more innovative designs, because really everything

1426 01:16:21.870 --> 01:16:24.840 I've talked about so far, the stepped wedge design,

1427 01:16:24.840 --> 01:16:27.900 cluster-randomized trial, interrupted time series

1428 01:16:27.900 --> 01:16:31.590 and so forth, those have been around for quite some time.

1429 01:16:31.590 --> 01:16:34.790 But now we can go into a little bit more of some model,

1430 01:16:34.790 --> 01:16:37.950 I mean some novel designs that are just starting

1431 01:16:37.950 --> 01:16:41.430 to be considered in implementation science.

1432 01:16:41.430 --> 01:16:44.073 In particular MOST, SMART and LAGO.

1433 01:16:47.100 --> 01:16:52.100 So the MOST design is one design that's very well

1434 01:16:52.410 --> 01:16:55.080 suited for complex,

1435 01:16:55.080 --> 01:16:57.933 multi-level, multi-component interventions.

1436 01:16:59.160 --> 01:17:02.400 That can be a very hard thing to set up at the start

1437 01:17:02.400 --> 01:17:04.530 of a study where when you've got all

1438 01:17:04.530 --> 01:17:06.990 these different features at different levels

1439 01:17:06.990 --> 01:17:09.720 to know exactly how to constitute

1440 01:17:09.720 --> 01:17:12.210 your intervention package, both

1441 01:17:12.210 --> 01:17:14.160 what's in it and what's not in it,

1442 01:17:14.160 --> 01:17:16.528 and at what kind of dose or strength

1443 01:17:16.528 --> 01:17:21.528 of implementation should each one of these components be.

1444 01:17:22.140 --> 01:17:23.430 So in the MOST design,

1445 01:17:23.430 --> 01:17:27.060 which was developed and promoted by a researcher

1446 01:17:27.060 --> 01:17:28.170 named Linda Collins,

1447 01:17:28.170 --> 01:17:30.420 and here's two of the key citations

1448 01:17:30.420 --> 01:17:34.470 to this design down here, there are three phases.

1449 01:17:34.470 --> 01:17:37.290 So what the first one is preparation,

1450 01:17:37.290 --> 01:17:41.670 and that's where things would be done,

1451 01:17:41.670 --> 01:17:44.406 such as developing the conceptual model

1452 01:17:44.406 --> 01:17:48.478 for what the implementation strategy might be,

1453 01:17:48.478 --> 01:17:53.478 to identify sets of candidate components and to

1454 01:17:55.020 --> 01:17:59.310 conduct pilot tests and identify optimization criteria.

1455 01:17:59.310 --> 01:18:00.810 And so what we mean by this is is

1456 01:18:00.810 --> 01:18:04.020 this might be done largely through qualitative research.

1457 01:18:04.020 --> 01:18:06.540 This is the first time I've mentioned qualitative

1458 01:18:06.540 --> 01:18:07.803 research in this talk.

1459 01:18:07.803 --> 01:18:10.980 It's a very important part of implementation science.

1460 01:18:10.980 --> 01:18:14.160 Because what would happen in a MOST design, for example,

1461 01:18:14.160 --> 01:18:17.160 and even often informally in all of these other

1462 01:18:17.160 --> 01:18:19.072 designs we've talked about or many of them,

1463 01:18:19.072 --> 01:18:21.690 is that qualitative researchers,

1464 01:18:21.690 --> 01:18:25.499 social scientists will conduct focus groups

1465 01:18:25.499 --> 01:18:30.499 and individual interviews of stakeholders

1466 01:18:33.030 --> 01:18:34.140 at the different levels.

1467 01:18:34.140 --> 01:18:39.140 Clients, providers, health systems leaders, network,

1468 01:18:39.420 --> 01:18:43.192 social network members to find out both what are

1469 01:18:43.192 --> 01:18:47.411 the facilitators and barriers to them taking advantage

1470 01:18:47.411 --> 01:18:52.089 of or utilizing and promoting

1471 01:18:52.089 --> 01:18:54.313 this evidence-based intervention.

1472 01:18:54.313 --> 01:18:57.750 And then also what their views might be

1473 01:18:57.750 --> 01:19:02.102 about different components of an intervention strategy,

1474 01:19:02.102 --> 01:19:05.203 or an implementation strategy that would make

1475 01:19:05.203 --> 01:19:09.972 this evidence-based intervention be adopted,

1476 01:19:09.972 --> 01:19:14.972 be more acceptable, be used with fidelity,

1477 01:19:15.387 --> 01:19:17.632 be sustainable and so forth.

1478 01:19:17.632 --> 01:19:20.130 And so with that kind of information

1479 01:19:20.130 --> 01:19:21.993 at the preparation phase,

1480 01:19:23.580 --> 01:19:25.770 you wouldn't really determine definitively

1481 01:19:25.770 --> 01:19:27.091 what the package would be,

1482 01:19:27.091 --> 01:19:30.120 but you would get some ideas of what should

1483 01:19:30.120 --> 01:19:31.950 and shouldn't be in the package,

1484 01:19:31.950 --> 01:19:33.900 it could be a much larger set than

1485 01:19:33.900 --> 01:19:37.050 what you ultimately will study.

1486 01:19:37.050 --> 01:19:39.785 And then at the optimization phase,

1487 01:19:39.785 --> 01:19:42.842 you would conduct a factorial design

1488 01:19:42.842 --> 01:19:47.186 that would take as many kind of combinations

1489 01:19:47.186 --> 01:19:51.480 of these implementation strategies and components

1490 01:19:51.480 --> 01:19:56.480 as possible and test them for response for some sort

1491 01:19:56.670 --> 01:20:00.630 of very short term implementation outcome,

1492 01:20:00.630 --> 01:20:03.120 which could be maybe even acceptability,

1493 01:20:03.120 --> 01:20:05.593 appropriateness and feasibility, and there are

1494 01:20:06.840 --> 01:20:08.970 five item scales that have been developed

1495 01:20:08.970 --> 01:20:13.140 by implementation scientists that can be used in that way.

1496 01:20:13.140 --> 01:20:15.186 And then based on, say, the responses,

1497 01:20:15.186 --> 01:20:17.320 you can then pare down

1498 01:20:18.240 --> 01:20:20.765 what the implementation strategy,

1499 01:20:20.765 --> 01:20:25.320 what the intervention package should be to then roll

1500 01:20:25.320 --> 01:20:29.844 out in a formal either stepped-wedge design

1501 01:20:29.844 --> 01:20:32.250 or cluster-randomized trial.

1502 01:20:32.250 --> 01:20:34.042 So what MOST does is it adds

1503 01:20:34.042 --> 01:20:36.826 on to these randomized designs that we had talked

1504 01:20:36.826 --> 01:20:41.670 about earlier these two phases, the preparation phase,

1505 01:20:41.670 --> 01:20:45.450 which can often be largely qualitative,

1506 01:20:45.450 --> 01:20:47.610 and then the optimization phase,

1507 01:20:47.610 --> 01:20:51.370 which involves a very short term pilot

1508 01:20:52.815 --> 01:20:57.690 high level factorial design to weed out the less

1509 01:20:57.690 --> 01:21:01.593 promising intervention package components.

1510 01:21:03.330 --> 01:21:08.151 And there's some examples of using the MOST design

1511 01:21:08.151 --> 01:21:11.610 and it definitely could be used a lot more often.

1512 01:21:11.610 --> 01:21:15.450 And hopefully people can see that this is like, you know,

1513 01:21:15.450 --> 01:21:20.370 sort of a more scientific and rigorous way to use data,

1514 01:21:20.370 --> 01:21:24.213 not just quantitative data, but also qualitative data to,

1515 01:21:25.290 --> 01:21:27.713 you know, sort of rigorously design a complex

1516 01:21:27.713 --> 01:21:31.143 intervention package before it's rolled out.

1517 01:21:46.050 --> 01:21:49.380 And then there's the question of adaptation

1518 01:21:49.380 --> 01:21:52.800 versus fidelity, and then that's gonna come up

1519 01:21:52.800 --> 01:21:54.900 for these next two designs.

1520 01:21:54.900 --> 01:21:59.880 So even after, say, using a MOST structure,

1521 01:21:59.880 --> 01:22:02.970 which would maximize the chances that you would kind

1522 01:22:02.970 --> 01:22:05.040 of get it right at baseline,

1523 01:22:05.040 --> 01:22:08.010 I'm sure everybody here who's actually rolled out any

1524 01:22:08.010 --> 01:22:11.370 kind of complex public health program of any sort

1525 01:22:11.370 --> 01:22:16.370 knows that the realistic scenario is that this program

1526 01:22:17.610 --> 01:22:20.119 is gonna be adapted as we go along,

1527 01:22:20.119 --> 01:22:24.060 providers are gonna learn, the system is gonna learn,

1528 01:22:24.060 --> 01:22:25.200 clients are gonna learn,

1529 01:22:25.200 --> 01:22:28.413 we're gonna learn like what isn't working,

1530 01:22:28.413 --> 01:22:30.660 what we can improve and so forth...

1531 01:22:30.660 --> 01:22:34.064 And so it's just basically impossible usually

1532 01:22:34.064 --> 01:22:36.120 for researchers to say,

1533 01:22:36.120 --> 01:22:39.874 and maybe even unethical for researchers to say, no,

1534 01:22:39.874 --> 01:22:42.517 you know, this is a randomized trial and you must

1535 01:22:42.517 --> 01:22:47.280 stick with this intervention that we set at baseline

1536 01:22:47.280 --> 01:22:48.420 no matter what.

1537 01:22:48.420 --> 01:22:51.270 Obviously that's what we do in a phase III

1538 01:22:51.270 --> 01:22:53.310 individually randomized clinical trial.

1539 01:22:53.310 --> 01:22:56.820 People either get the new drug or the placebo

1540 01:22:56.820 --> 01:22:59.430 and we don't change the new drug after baseline,

1541 01:22:59.430 --> 01:23:02.188 even if it's, people are getting the feeling somehow

1542 01:23:02.188 --> 01:23:05.040 that it's not doing what it's supposed to do,

1543 01:23:05.040 --> 01:23:07.140 all we can do is like early stopping

1544 01:23:07.140 --> 01:23:11.298 for overwhelming evidence of benefit or harm.

1545 01:23:11.298 --> 01:23:16.298 So this very busy slide is taken from this article

1546 01:23:16.320 --> 01:23:20.040 down here and it's a framework for reporting

1547 01:23:20.040 --> 01:23:22.290 adaptations and modifications

1548 01:23:22.290 --> 01:23:24.480 to evidence-based interventions.

1549 01:23:24.480 --> 01:23:26.880 So the reason, it's complicated,

1550 01:23:26.880 --> 01:23:31.290 but that's because what these researchers are trying

1551 01:23:31.290 --> 01:23:35.850 to do is think of every possible kind of category

1552 01:23:35.850 --> 01:23:38.400 of adaptation that could take place

1553 01:23:38.400 --> 01:23:42.202 after an intervention is started to help people

1554 01:23:42.202 --> 01:23:45.600 record the adaptations.

1555 01:23:45.600 --> 01:23:48.930 Because those of us who kind of want

1556 01:23:48.930 --> 01:23:50.940 implementation science to be relevant,

1557 01:23:50.940 --> 01:23:55.030 one of the three Rs, realize that we should not only

1558 01:23:56.550 --> 01:23:59.340 allow adaptations, we should embrace

1559 01:23:59.340 --> 01:24:03.220 adaptations because they're only gonna likely improve

1560 01:24:04.080 --> 01:24:07.744 the success of these evidence-based interventions.

1561 01:24:07.744 --> 01:24:11.639 But the only way to learn in a rigorous way,

1562 01:24:11.639 --> 01:24:16.500 what aspects of adaptation are actually working,

1563 01:24:16.500 --> 01:24:18.600 is to be able to record them.

1564 01:24:18.600 --> 01:24:20.400 And then once they're recorded,

1565 01:24:20.400 --> 01:24:22.470 later on in secondary analysis,

1566 01:24:22.470 --> 01:24:25.710 we can go back and analyze the data because all

1567 01:24:25.710 --> 01:24:29.910 of these adaptations are just like exposure variables

1568 01:24:29.910 --> 01:24:32.550 in a complex epidemiologic study,

1569 01:24:32.550 --> 01:24:34.830 and using causal inference methods to control

1570 01:24:34.830 --> 01:24:38.007 for confounding, we can look at which adaptations

1571 01:24:38.007 --> 01:24:41.700 actually improved outcomes, which made outcomes worse,

1572 01:24:41.700 --> 01:24:43.920 which didn't do anything,

1573 01:24:43.920 --> 01:24:46.950 we can evaluate their cost-effectiveness and so forth,

1574 01:24:46.950 --> 01:24:49.380 but if they're not recorded, we're stuck.

1575 01:24:49.380 --> 01:24:52.380 So that's why I have this very busy slide here.

1576 01:24:52.380 --> 01:24:56.550 It's a very, very important one in terms of ensuring

1577 01:24:56.550 --> 01:25:00.723 that implementation science produces relevant results.

1578 01:25:02.430 --> 01:25:04.323 In a rigorous manner.

1579 01:25:07.440 --> 01:25:10.252 Now we can talk about the learn as you go design.

1580 01:25:10.252 --> 01:25:12.930 So that's a design that's very dear to my heart

1581 01:25:12.930 --> 01:25:15.690 because as you can see here to the left hand side,

1582 01:25:15.690 --> 01:25:18.630 I'm one of the people who's developed this design,

1583 01:25:18.630 --> 01:25:23.263 and it's a very new design, we just published it last year.

1584 01:25:23.263 --> 01:25:28.263 We are in the process of using it in a study going on.

1585 01:25:28.369 --> 01:25:30.150 Some of you might be part

1586 01:25:30.150 --> 01:25:35.150 of the HLB-SIMPLe consortium that's supported

1587 01:25:35.250 --> 01:25:37.800 by the United States National Heart,

1588 01:25:37.800 --> 01:25:39.210 Lung, and Blood Institute.

1589 01:25:39.210 --> 01:25:40.560 It's a series of,

1590 01:25:40.560 --> 01:25:44.623 I think maybe six or more studies taking place

1591 01:25:45.589 --> 01:25:50.430 in sub-Saharan Africa where what's being looked

1592 01:25:50.430 --> 01:25:53.100 at is different ways of integrating

1593 01:25:53.100 --> 01:25:56.100 hypertension prevention, screening and treatment

1594 01:25:56.100 --> 01:26:00.570 into HIV clinics with the idea that, as we all know,

1595 01:26:00.570 --> 01:26:02.490 the AIDS epidemic has,

1596 01:26:02.490 --> 01:26:05.850 AIDS has become a chronic disease everywhere in the world.

1597 01:26:05.850 --> 01:26:09.630 And we have aging HIV AIDS patients

1598 01:26:09.630 --> 01:26:11.910 and they're getting chronic diseases just like

1599 01:26:11.910 --> 01:26:14.880 those of us who are HIV negative.

1600 01:26:14.880 --> 01:26:19.184 And the idea, the concept of integration of care, I think,

1601 01:26:19.184 --> 01:26:22.560 is a very important one in global health

1602 01:26:22.560 --> 01:26:24.210 and US domestic health.

1603 01:26:24.210 --> 01:26:26.760 And this consortium is playing a role

1604 01:26:26.760 --> 01:26:28.590 in making this happen.

1605 01:26:28.590 --> 01:26:32.550 So I'm the statistician for one of the projects,

1606 01:26:32.550 --> 01:26:35.670 it's called Police and it's taking place in two

1607 01:26:35.670 --> 01:26:38.380 districts in Uganda where we're integrating

1608 01:26:39.270 --> 01:26:42.133 two types of intervention packages

1609 01:26:45.240 --> 01:26:47.207 into HIV clinics,

1610 01:26:47.207 --> 01:26:51.450 hypertension basic and hypertension plus to try to

1611 01:26:51.450 --> 01:26:53.850 increase hypertension screening and treatment

1612 01:26:53.850 --> 01:26:56.760 and prevention in the clinics there.

1613 01:26:56.760 --> 01:27:01.760 And we're gonna be using this LAGO design. So what is LAGO?

1614 01:27:01.980 --> 01:27:03.000 Well first of all,

1615 01:27:03.000 --> 01:27:04.612 the intervention is a package consisting

1616 01:27:04.612 --> 01:27:06.390 of multiple components.

1617 01:27:06.390 --> 01:27:09.390 We've both basically been talking about multiple

1618 01:27:09.390 --> 01:27:12.810 component interventions throughout this talk.

1619 01:27:12.810 --> 01:27:17.810 And it can include combinations with treatments, a device,

1620 01:27:19.020 --> 01:27:22.110 care organization, multiple stakeholders,

1621 01:27:22.110 --> 01:27:25.620 and similar stepped wedge design in a LAGO design

1622 01:27:25.620 --> 01:27:28.210 the data analyzed after each stage.

1623 01:27:28.210 --> 01:27:31.170 And then what makes it like radically different

1624 01:27:31.170 --> 01:27:33.811 in a way from other prior study designs

1625 01:27:33.811 --> 01:27:37.050 is it's actually possible in this design

1626 01:27:37.050 --> 01:27:41.730 to reconfigure the intervention package and not just do

1627 01:27:41.730 --> 01:27:43.500 it sort of in a more ad hoc way,

1628 01:27:43.500 --> 01:27:44.920 as we were talking about

1629 01:27:50.043 --> 01:27:51.120 with the previous slide

1630 01:27:51.120 --> 01:27:54.093 on how to adapt interventions.

1631 01:27:55.500 --> 01:27:58.740 But you do it in a formal way where we have

1632 01:27:58.740 --> 01:28:02.010 a computer algorithm that will take all the data up

1633 01:28:02.010 --> 01:28:04.770 to the current stage, analyze it,

1634 01:28:04.770 --> 01:28:07.587 and then the data itself recommend

1635 01:28:07.587 --> 01:28:10.770 what's the optimal combination of the intervention

1636 01:28:10.770 --> 01:28:12.480 for the next stage.

1637 01:28:12.480 --> 01:28:15.810 And optimality would be determined by both trying

1638 01:28:15.810 --> 01:28:19.170 to guarantee that we have adequate statistical power

1639 01:28:19.170 --> 01:28:21.840 to test the overall intervention effect at the end

1640 01:28:21.840 --> 01:28:23.040 of the study.

1641 01:28:23.040 --> 01:28:25.590 And that it might be that we're trying to achieve also

1642 01:28:25.590 --> 01:28:27.210 a certain outcome goal.

1643 01:28:27.210 --> 01:28:30.300 So like in the Police study I was just talking about,

1644 01:28:30.300 --> 01:28:34.233 we think that about 20% of people,

1645 01:28:35.489 --> 01:28:38.248 20% of adults over,

1646 01:28:38.248 --> 01:28:42.430 HIV positive adults in the clinics might

1647 01:28:43.500 --> 01:28:47.610 be hypertensive and be in hypertension control.

1648 01:28:47.610 --> 01:28:51.300 And then we're hoping to improve that to, say, 40%.

1649 01:28:51.300 --> 01:28:54.317 So the goal of the study is to get to 40%

1650 01:28:54.317 --> 01:28:55.392 through the intervention.

1651 01:28:55.392 --> 01:28:57.120 You might think that's modest,

1652 01:28:57.120 --> 01:28:59.559 but another thing that I've seen is sometimes

1653 01:28:59.559 --> 01:29:01.403 with these kinds of studies,

1654 01:29:01.403 --> 01:29:04.470 people are overly ambitious and they might say,

1655 01:29:04.470 --> 01:29:08.280 we wanna get like 80% or 90% of hypertension control

1656 01:29:08.280 --> 01:29:09.270 by the end of the study.

1657 01:29:09.270 --> 01:29:12.843 But you know, if we're starting from 5%, 10% or 20%

1658 01:29:12.843 --> 01:29:14.850 to get all the way to like, say,

1659 01:29:14.850 --> 01:29:19.850 80%, we're starting to talk about relative risks of 160.

1660 01:29:20.220 --> 01:29:21.090 Those are like, you know,

1661 01:29:21.090 --> 01:29:24.240 huge intervention effects that maybe we're being too

1662 01:29:24.240 --> 01:29:27.720 hard on ourselves when we try to achieve goals like that,

1663 01:29:27.720 --> 01:29:30.300 even though that's what where we might ultimately

1664 01:29:30.300 --> 01:29:31.533 might wanna get to.

1665 01:29:32.970 --> 01:29:37.282 So back to the LAGO design, we can, using the data,

1666 01:29:37.282 --> 01:29:39.845 we can recommend the optimal intervention package

1667 01:29:39.845 --> 01:29:42.120 for the next stage.

1668 01:29:42.120 --> 01:29:44.788 We can also use qualitative data and we don't have

1669 01:29:44.788 --> 01:29:46.950 to just use the quantitative data,

1670 01:29:46.950 --> 01:29:49.980 we can reconfigure the intervention package,

1671 01:29:49.980 --> 01:29:53.044 then we roll it out again and then we repeat that up

1672 01:29:53.044 --> 01:29:57.630 to as many times as was preplanned.

1673 01:29:57.630 --> 01:30:01.200 And then we can, at the end of the study, ideally,

1674 01:30:01.200 --> 01:30:03.540 we would have a final outcome assessment,

1675 01:30:03.540 --> 01:30:05.970 we test the null hypothesis that the intervention

1676 01:30:05.970 --> 01:30:07.380 had no effect.

1677 01:30:07.380 --> 01:30:09.390 We could assess the cost-effectiveness

1678 01:30:09.390 --> 01:30:12.033 of the different intervention components.

1679 01:30:13.296 --> 01:30:17.552 We have a model that we can use,

1680 01:30:17.552 --> 01:30:19.900 that could predict for different

1681 01:30:21.352 --> 01:30:22.737 intervention component combinations,

1682 01:30:29.809 --> 01:30:32.760 what level of the outcome we might expect to have

1683 01:30:32.760 --> 01:30:34.050 and so forth.

1684 01:30:34.050 --> 01:30:35.550 So that's the LAGO design,

1685 01:30:35.550 --> 01:30:38.340 we'll see how it works in Police and hopefully

1686 01:30:38.340 --> 01:30:39.300 some other studies.

1687 01:30:39.300 --> 01:30:42.210 There's some other projects under consideration

1688 01:30:42.210 --> 01:30:45.033 for funding that have also proposed to use LAGO.

1689 01:30:46.260 --> 01:30:48.960 And I'll give an example of LAGO here.

1690 01:30:48.960 --> 01:30:50.850 This is a post-hoc design.

1691 01:30:50.850 --> 01:30:53.460 So it's an illustrative example that we used

1692 01:30:53.460 --> 01:30:57.000 in our paper in this Annals of Statistics paper

1693 01:30:57.000 --> 01:30:58.287 that was published in 2021.

1694 01:30:58.287 --> 01:31:02.250 And by the way, not to kind of toot my horn,

1695 01:31:02.250 --> 01:31:05.372 but just to emphasize the rigor of this design

1696 01:31:05.372 --> 01:31:07.110 because it is, you know,

1697 01:31:07.110 --> 01:31:09.300 very different for people to accept that you can

1698 01:31:09.300 --> 01:31:12.330 actually change your intervention after you start

1699 01:31:12.330 --> 01:31:14.910 the study and still have a valid P value.

1700 01:31:14.910 --> 01:31:15.743 You know,

1701 01:31:15.743 --> 01:31:19.350 the mathematics to prove this were quite high level.

1702 01:31:19.350 --> 01:31:21.660 And the journal where this paper was published,

1703 01:31:21.660 --> 01:31:24.203 the Annals of Statistics, is kind of considered one

1704 01:31:24.203 --> 01:31:28.230 of the top and most theoretical journals in statistics.

1705 01:31:28.230 --> 01:31:32.850 So this design is like really okay, it just,

1706 01:31:32.850 --> 01:31:35.940 it's okay theoretically, but it does need to kind

1707 01:31:35.940 --> 01:31:39.240 of be fleshed out in terms of being used and working

1708 01:31:39.240 --> 01:31:41.040 at the kinks on a practical level.

1709 01:31:41.040 --> 01:31:42.065 And as we start to use it,

1710 01:31:42.065 --> 01:31:44.760 I'm sure we'll start to learn a lot of things and be

1711 01:31:44.760 --> 01:31:46.530 able to further improve it.

1712 01:31:46.530 --> 01:31:50.580 But anyway, we took the BetterBirth study

1713 01:31:50.580 --> 01:31:53.940 as our example in this Annals of Statistics paper.

1714 01:31:53.940 --> 01:31:56.520 It was a multicenter study that was conducted

1715 01:31:56.520 --> 01:31:59.790 in Uttar Pradesh, India, which is a poor state

1716 01:31:59.790 --> 01:32:01.320 in Northern India.

1717 01:32:01.320 --> 01:32:06.320 And its purpose was to test multiple component intervention

1718 01:32:06.749 --> 01:32:09.390 package to improve process

1719 01:32:09.390 --> 01:32:12.180 and health outcomes for mothers and newborns,

1720 01:32:12.180 --> 01:32:17.180 that is to lower maternal mortality and neonatal mortality

1721 01:32:17.250 --> 01:32:20.895 in the state where the rates were unacceptably high.

1722 01:32:20.895 --> 01:32:24.523 The components involved: launching the intervention,

1723 01:32:24.523 --> 01:32:26.512 how many coaching visits,

1724 01:32:26.512 --> 01:32:31.500 how many times healthcare providers received

1725 01:32:31.500 --> 01:32:35.280 coaching visits, how often, the frequency, the duration,

1726 01:32:35.280 --> 01:32:37.050 there's audit and feedback loops,

1727 01:32:37.050 --> 01:32:40.110 which is a very popular method in implementation

1728 01:32:40.110 --> 01:32:44.106 science where it can be through direct observation

1729 01:32:44.106 --> 01:32:46.909 or through electronic health records,

1730 01:32:46.909 --> 01:32:50.760 providers are audited as to what extent

1731 01:32:50.760 --> 01:32:52.803 they're actually implementing the intervention

1732 01:32:52.803 --> 01:32:57.147 and they're given feedback as to how well they're doing,

1733 01:32:57.147 --> 01:32:59.940 and then oftentimes there can be group discussions

1734 01:32:59.940 --> 01:33:02.070 where people talk about, you know,

1735 01:33:02.070 --> 01:33:04.560 what were the barriers to why they didn't do it more

1736 01:33:04.560 --> 01:33:07.050 and how could they do it more often and so forth,

1737 01:33:07.050 --> 01:33:10.350 and that's been shown to be a proven way to improve

1738 01:33:10.350 --> 01:33:15.300 the uptake of a evidence-based intervention program

1739 01:33:15.300 --> 01:33:17.811 at the provider and system level.

1740 01:33:17.811 --> 01:33:18.781 And then of course,

1741 01:33:18.781 --> 01:33:22.920 stakeholder engagement is increasingly taken to be

1742 01:33:22.920 --> 01:33:26.183 an important part of successful sustainable

1743 01:33:26.183 --> 01:33:29.820 interventions conducted at high fidelity.

1744 01:33:29.820 --> 01:33:33.030 And so engaging the district and facility leaders

1745 01:33:33.030 --> 01:33:35.910 was another important part of this package.

1746 01:33:35.910 --> 01:33:40.818 And there were three stages of the study.

1747 01:33:40.818 --> 01:33:43.980 In stage one, they piloted this intervention

1748 01:33:43.980 --> 01:33:48.630 in two centers, then through, you know, non-rigorously,

1749 01:33:48.630 --> 01:33:52.170 not using LAGO, they then adapted the intervention

1750 01:33:52.170 --> 01:33:55.850 package and they piloted it in four more centers.

1751 01:33:55.850 --> 01:34:00.104 And then in stage three they rolled out a full trial

1752 01:34:00.104 --> 01:34:03.270 in 30 centers where the intervention was fixed

1753 01:34:03.270 --> 01:34:05.024 and they couldn't change it any more.

1754 01:34:05.024 --> 01:34:07.002 And in stages one and two,

1755 01:34:07.002 --> 01:34:09.840 they used both quantitative and qualitative data

1756 01:34:09.840 --> 01:34:11.561 to guide the adaptation.

1757 01:34:11.561 --> 01:34:16.011 And so this is again, a very big ambitious trial.

1758 01:34:16.011 --> 01:34:19.899 There were 120 sites in 24 districts

1759 01:34:19.899 --> 01:34:24.899 and it involved almost 160,000 pregnancies.

1760 01:34:25.350 --> 01:34:30.270 And the intervention, the primary outcome was

1761 01:34:30.270 --> 01:34:34.731 an implementation outcome and it was use of the WHO

1762 01:34:34.731 --> 01:34:38.640 safe childbirth checklist with many of you might

1763 01:34:38.640 --> 01:34:41.640 be familiar with, there are 27 different things

1764 01:34:41.640 --> 01:34:44.189 that are supposed to be done at different stages

1765 01:34:44.189 --> 01:34:46.535 when a woman comes in to give birth

1766 01:34:46.535 --> 01:34:49.530 with the different stages of pregnancy and right

1767 01:34:49.530 --> 01:34:51.600 after and so forth.

1768 01:34:51.600 --> 01:34:56.280 And the WHO recommends that this safe childbirth checklist,

1769 01:34:56.280 --> 01:34:58.676 which is a means of trying to ensure

1770 01:34:58.676 --> 01:35:03.676 that these 27 evidence-based, you know, components be used,

1771 01:35:04.549 --> 01:35:08.940 that it should be used at least 90% of the time.

1772 01:35:08.940 --> 01:35:10.920 So that was the goal of the study.

1773 01:35:10.920 --> 01:35:13.050 Again, they were, I think in this study it was

1774 01:35:13.050 --> 01:35:15.810 at something like 5% where it was happening.

1775 01:35:15.810 --> 01:35:19.383 So extremely ambitious and probably unrealistic.

1776 01:35:20.730 --> 01:35:22.590 And then we could look at different outcomes.

1777 01:35:22.590 --> 01:35:26.970 So one outcome is, that we looked at, just, this is, again,

1778 01:35:26.970 --> 01:35:29.784 an illustrative example of the LAGO design was

1779 01:35:29.784 --> 01:35:34.578 adherence to oxytocin administration after birth

1780 01:35:34.578 --> 01:35:36.247 or after delivery.

1781 01:35:36.247 --> 01:35:38.100 And then we could also look at, say,

1782 01:35:38.100 --> 01:35:41.130 seven day mortality of the mother and or the child.

1783 01:35:41.130 --> 01:35:42.750 And then there were also costs, say,

1784 01:35:42.750 --> 01:35:45.333 the costs per coaching session.

1785 01:35:52.410 --> 01:35:56.340 Okay. So that's an example of the LAGO design.

1786 01:35:56.340 --> 01:35:59.640 And in fact, just to say that this study was published

1787 01:35:59.640 --> 01:36:01.978 in the New England Journal of Medicine

1788 01:36:01.978 --> 01:36:04.160 and the design,

1789 01:36:05.682 --> 01:36:09.120 it was published here in implementation science in 2015.

1790 01:36:09.120 --> 01:36:10.640 And then the outcome was the,

1791 01:36:10.640 --> 01:36:13.027 in the New England Journal of Medicine.

1792 01:36:13.027 --> 01:36:14.010 And in fact,

1793 01:36:14.010 --> 01:36:18.420 the trial was not successful in achieving its goals.

1794 01:36:18.420 --> 01:36:20.670 And probably what happened was,

1795 01:36:20.670 --> 01:36:22.590 you could say that's why we said, well,

1796 01:36:22.590 --> 01:36:25.320 if LAGO could have been used at stage three

1797 01:36:25.320 --> 01:36:27.150 when there were all 30 centers,

1798 01:36:27.150 --> 01:36:29.149 there could have been more feedback figuring

1799 01:36:29.149 --> 01:36:33.210 out what aspects of this is working,

1800 01:36:33.210 --> 01:36:36.060 what aspects of these components are working

1801 01:36:36.060 --> 01:36:36.893 and not working.

1802 01:36:37.920 --> 01:36:40.670 And then maybe some other things need to be brought in.

1803 01:36:48.330 --> 01:36:51.423 Oh, somebody else who's maybe unmuted.

1804 01:36:53.345 --> 01:36:57.998 They failed to increase the use of the safe

1805 01:36:57.998 --> 01:37:02.710 childbirth checklist to 90%, but they did improve it.

1806 01:37:02.710 --> 01:37:04.260 But they also, I don't think,

1807 01:37:04.260 --> 01:37:07.020 failed to see significant differences in, say,

1808 01:37:07.020 --> 01:37:09.300 health outcomes of mother and or child.

1809 01:37:09.300 --> 01:37:14.300 So it's an example of how unfortunate it could be

1810 01:37:14.340 --> 01:37:17.880 to have a very big study like this with a very

1811 01:37:17.880 --> 01:37:20.733 complex intervention following,

1812 01:37:22.465 --> 01:37:26.580 attempting to implement WHO standards and then

1813 01:37:26.580 --> 01:37:28.920 being hard-coded in like this.

1814 01:37:28.920 --> 01:37:31.230 So there's no way to adapt and improve

1815 01:37:31.230 --> 01:37:33.810 the intervention when it starts to look like

1816 01:37:33.810 --> 01:37:36.633 it's not achieving its goals.

1817 01:37:40.770 --> 01:37:41.940 So now I'm gonna talk

1818 01:37:41.940 --> 01:37:44.160 about effectiveness implementing-

1819 01:37:44.160 --> 01:37:46.230 <v ->Donna?</v> <v ->Yes.</v>

1820 01:37:46.230 --> 01:37:49.200 <v Speaker>Yeah, it's been a wonderful time.</v>

1821 01:37:49.200 --> 01:37:52.210 I don't know, how many slides do you have left?

1822 01:37:52.210 --> 01:37:55.060 <v Presenter>Yeah, I'm not even sure myself. Let me see.</v>

1823 01:37:56.070 --> 01:37:57.780 <v Speaker>So, because, you know,</v>

1824 01:37:57.780 --> 01:38:00.540 this is Nigeria and it's about...

1825 01:38:00.540 --> 01:38:03.150 <v Presenter>And it's late, right? Yeah, okay.</v>

1826 01:38:03.150 --> 01:38:05.599 Oh, I was almost there actually.

1827 01:38:05.599 --> 01:38:07.170 <v Speaker>Almost there. Okay.</v>

1828 01:38:07.170 --> 01:38:09.190 Oh good, good. Okay. <v ->Yes.</v>

1829 01:38:09.190 --> 01:38:13.530 So, sorry everybody, you know, I'm very excited,

1830 01:38:13.530 --> 01:38:15.990 there's a lot of material to cover and maybe I should

1831 01:38:15.990 --> 01:38:17.610 have weeded it down a little bit more,

1832 01:38:17.610 --> 01:38:20.370 but I really appreciate you all hanging in there with me.

1833 01:38:20.370 --> 01:38:22.620 I can see we've lost very few people there.

1834 01:38:22.620 --> 01:38:24.417 <v Speaker>We're happy with you too.</v>

1835 01:38:24.417 --> 01:38:26.990 And the lecture is quite illuminating.

1836 01:38:26.990 --> 01:38:28.320 <v Presenter>So I'll just quickly say</v>

1837 01:38:28.320 --> 01:38:31.200 that because of an implementation science,

1838 01:38:31.200 --> 01:38:33.690 I've been mostly talking about the interventions

1839 01:38:33.690 --> 01:38:34.890 in the design point of view,

1840 01:38:34.890 --> 01:38:39.068 but there's also this hybrid design framework

1841 01:38:39.068 --> 01:38:44.068 where we can think of combined outcomes

1842 01:38:44.820 --> 01:38:48.630 or differently emphasizing the health outcome versus

1843 01:38:48.630 --> 01:38:50.820 the implementation outcome.

1844 01:38:50.820 --> 01:38:54.750 So there are three types, type 1, type 2, type 3.

1845 01:38:54.750 --> 01:38:58.290 And the goal here in using these hybrid designs

1846 01:38:58.290 --> 01:39:01.680 is to accelerate transition from effectiveness trials

1847 01:39:01.680 --> 01:39:03.780 to implementation trials.

1848 01:39:03.780 --> 01:39:06.300 And this is a very unique design.

1849 01:39:06.300 --> 01:39:10.064 Here is the reference for it in implementation science.

1850 01:39:10.064 --> 01:39:13.410 And so the type 1, 2, and 3, I'll show

1851 01:39:13.410 --> 01:39:14.790 you on the next slide.

1852 01:39:14.790 --> 01:39:19.320 So the type 1, the focus is the clinical intervention.

1853 01:39:19.320 --> 01:39:22.830 So that would be, say, in, let's say,

1854 01:39:22.830 --> 01:39:27.180 in the examples I've given actually,

1855 01:39:27.180 --> 01:39:31.740 the clinical intervention, none of the examples

1856 01:39:31.740 --> 01:39:34.110 I've given actually were a type 1 design,

1857 01:39:34.110 --> 01:39:35.940 'cause the clinical, let's say

1858 01:39:35.940 --> 01:39:38.718 with BetterBirth, which we were just talking about,

1859 01:39:38.718 --> 01:39:41.040 the clinical intervention would be,

1860 01:39:41.040 --> 01:39:43.320 I think actually they were powered for combined

1861 01:39:43.320 --> 01:39:47.400 endpoint of maternal and neonatal morbidity and mortality,

1862 01:39:47.400 --> 01:39:49.353 that would make it a type 1 design.

1863 01:39:49.353 --> 01:39:51.360 But then they were also measuring

1864 01:39:51.360 --> 01:39:54.030 the implementation outcome of the extent

1865 01:39:54.030 --> 01:39:57.390 to which the Safe Childbirth Checklist was used.

1866 01:39:57.390 --> 01:39:58.500 That's an implementation

1867 01:39:58.500 --> 01:40:01.110 outcome that wasn't their primary outcome.

1868 01:40:01.110 --> 01:40:03.720 So that makes it a hybrid type 1 design.

1869 01:40:03.720 --> 01:40:05.130 A hybrid type 2 design,

1870 01:40:05.130 --> 01:40:07.350 which a lot of people are very interested in,

1871 01:40:07.350 --> 01:40:09.750 would mean that we jointly think we power

1872 01:40:09.750 --> 01:40:13.980 the study both to ensure that we have the power to detect

1873 01:40:13.980 --> 01:40:16.652 a meaningful difference in the clinical outcome,

1874 01:40:16.652 --> 01:40:20.040 but also in the implementation strategy

1875 01:40:20.040 --> 01:40:21.981 and their co-primary endpoints.

1876 01:40:21.981 --> 01:40:25.360 And then the hybrid types 3 would be,

1877 01:40:25.360 --> 01:40:29.482 focusing exclusively on the implementation endpoint.

1878 01:40:29.482 --> 01:40:32.190 But we're still measuring the health outcome

1879 01:40:32.190 --> 01:40:34.924 just to get some idea that maybe in this new context,

1880 01:40:34.924 --> 01:40:36.979 we're at this greater scale,

1881 01:40:36.979 --> 01:40:40.133 maybe we might see a difference, good or bad,

1882 01:40:40.133 --> 01:40:42.180 in the health endpoint.

1883 01:40:42.180 --> 01:40:44.700 So those hybrid designs I think are very useful

1884 01:40:44.700 --> 01:40:47.030 in implementation science and I'd encourage you all

1885 01:40:47.030 --> 01:40:48.510 to use them.

1886 01:40:48.510 --> 01:40:50.943 So this is my last slide.

1887 01:40:51.840 --> 01:40:54.930 These are a few textbooks on implementation science

1888 01:40:54.930 --> 01:40:57.928 that I encourage people to take a look at, if you can.

1889 01:40:57.928 --> 01:41:01.590 Implementation studies require consideration of context,

1890 01:41:01.590 --> 01:41:05.910 multiple levels, multiple components, timing matters.

1891 01:41:05.910 --> 01:41:07.560 When you're thinking about conducting

1892 01:41:07.560 --> 01:41:09.600 an implementation science study,

1893 01:41:09.600 --> 01:41:12.450 you can identify and rank potential study designs

1894 01:41:12.450 --> 01:41:14.790 then decide, and I've gone through a number

1895 01:41:14.790 --> 01:41:17.070 of the most important ones and discuss some

1896 01:41:17.070 --> 01:41:19.012 of their pros and cons.

1897 01:41:19.012 --> 01:41:22.410 We'll consider randomization and real world rollouts

1898 01:41:22.410 --> 01:41:25.020 when possible to increase rigor.

1899 01:41:25.020 --> 01:41:28.060 But also I'm mentioning if randomization is not possible,

1900 01:41:28.060 --> 01:41:30.750 there are quasi-experimental and observational

1901 01:41:30.750 --> 01:41:33.481 designs available for which causal inference methods

1902 01:41:33.481 --> 01:41:34.850 can be applied.

1903 01:41:34.850 --> 01:41:37.470 And consider some of these innovative approaches

1904 01:41:37.470 --> 01:41:39.690 if they're relevant to your study.

1905 01:41:39.690 --> 01:41:41.370 So thank you all very much.

1906 01:41:41.370 --> 01:41:44.652 I'm sorry for keeping you up so late tonight.

1907 01:41:44.652 --> 01:41:47.340 It's been a pleasure to talking with you all

1908 01:41:47.340 --> 01:41:49.113 and sharing this information.

1909 01:41:52.095 --> 01:41:57.095 <v Speaker>Wow, wow, wow, wow. Donna, you are fantastic.</v>

1910 01:41:58.170 --> 01:41:59.866 We're very, very greatful.

1911 01:41:59.866 --> 01:42:01.801 <v ->Thank you so much, Ike.</v>

1912 01:42:01.801 --> 01:42:03.947 <v Speaker>Everyone...</v>

1913 01:42:03.947 --> 01:42:08.010 So I mean we're all still listening

1914 01:42:08.010 --> 01:42:11.400 to you since you started the lecture,

1915 01:42:11.400 --> 01:42:16.400 that shows that we really appreciate you and actually

1916 01:42:16.410 --> 01:42:19.503 no other person could have delivered this lecture but you,

1917 01:42:20.444 --> 01:42:24.420 the expertise cannot be underestimated.

1918 01:42:24.420 --> 01:42:28.590 We are very, very grateful, and if you look at the chat,

1919 01:42:28.590 --> 01:42:32.490 oh, it's something that is quite encouraging,

1920 01:42:32.490 --> 01:42:37.490 I wish, I've saved the chat, so I will send this to you.

1921 01:42:37.860 --> 01:42:39.600 Wonderful time,

1922 01:42:39.600 --> 01:42:44.510 highly appreciated lecture, stimulating lecture...

1923 01:42:45.480 --> 01:42:48.390 It's still coming. Wow, great.

1924 01:42:48.390 --> 01:42:52.320 Thanks to the lecturer. So you can imagine.

1925 01:42:52.320 --> 01:42:53.730 So we're really very,

1926 01:42:53.730 --> 01:42:58.730 very happy and really I'm sure I'm going to be

1927 01:42:58.740 --> 01:43:02.027 bombarded with requests for you to come.

1928 01:43:02.923 --> 01:43:04.020 <v Presenter>Well, Erica Saracho</v>

1929 01:43:04.020 --> 01:43:06.210 who's assisting me with this.

1930 01:43:06.210 --> 01:43:08.190 Erica, are you still on?

1931 01:43:08.190 --> 01:43:10.050 Because we should capture the chat,

1932 01:43:10.050 --> 01:43:12.270 a number of people are asking for the slides

1933 01:43:12.270 --> 01:43:16.320 and we can get back to everybody with these slides.

1934 01:43:16.320 --> 01:43:18.690 <v ->Good.</v> <v ->Yes, Donna,</v>

1935 01:43:18.690 --> 01:43:20.280 I saved the chats.

1936 01:43:20.280 --> 01:43:23.790 <v ->Thank you so much, Erica.</v> <v ->Thank you very much, Erica.</v>

1937 01:43:23.790 --> 01:43:28.790 And so let us have some questions.

1938 01:43:29.040 --> 01:43:34.040 I'm sure some of us would want to clarify

1939 01:43:34.560 --> 01:43:37.710 whatever gray areas they have.

1940 01:43:37.710 --> 01:43:41.700 So I've asked them to send in their questions

1941 01:43:41.700 --> 01:43:44.340 but I've not seen one.

1942 01:43:44.340 --> 01:43:47.130 What we are just seeing is email addresses,

1943 01:43:47.130 --> 01:43:48.930 send me lectures.

1944 01:43:48.930 --> 01:43:53.040 So our colleagues there,

1945 01:43:53.040 --> 01:43:57.660 could you please send in your questions

1946 01:43:57.660 --> 01:43:59.070 because she's here now,

1947 01:43:59.070 --> 01:44:02.860 she can clarify things and also give you some

1948 01:44:03.720 --> 01:44:06.060 better understanding of the slides

1949 01:44:06.060 --> 01:44:08.010 that you are requesting for.

1950 01:44:08.010 --> 01:44:08.843 Please... <v ->I know,</v>

1951 01:44:08.843 --> 01:44:11.730 but maybe it's so late, Ike, maybe people,

1952 01:44:11.730 --> 01:44:14.087 it's too late to actually take questions now.

1953 01:44:14.087 --> 01:44:16.912 I mean I'm fine but I understand it is quite

1954 01:44:16.912 --> 01:44:19.814 late for people and I understand if people would like

1955 01:44:19.814 --> 01:44:23.583 to just say goodbye at this time.

1956 01:44:24.984 --> 01:44:29.984 <v Speaker>Let me just wait, maybe let's, can you unmute?</v>

1957 01:44:30.210 --> 01:44:33.300 Erica, can you unmute and let's see

1958 01:44:33.300 --> 01:44:38.300 anyone raising up his hand, anyone raising up?

1959 01:44:39.840 --> 01:44:41.970 <v Speaker>I think there are two questions earlier</v>

1960 01:44:41.970 --> 01:44:43.233 if you scroll up.

1961 01:44:45.618 --> 01:44:48.330 <v Speaker>Yeah, there is one I actually, okay,</v>

1962 01:44:48.330 --> 01:44:53.280 there is one here that says how do we balance

1963 01:44:53.280 --> 01:44:58.280 between rigor and relevance in implementation size?

1964 01:45:01.350 --> 01:45:03.032 <v Presenter>Yeah, so that's a great question.</v>

1965 01:45:03.032 --> 01:45:04.890 <v ->Do you have-</v> <v ->Absolutely.</v>

1966 01:45:04.890 --> 01:45:06.990 Yeah, that's a great question.

1967 01:45:06.990 --> 01:45:08.730 And you know,

1968 01:45:08.730 --> 01:45:12.960 my view is there's no right answer to that.

1969 01:45:12.960 --> 01:45:16.230 That, you know, it's really, you have to say it depends,

1970 01:45:16.230 --> 01:45:20.040 but, you know, in my opinion I feel

1971 01:45:20.040 --> 01:45:23.460 that implementation science so far has

1972 01:45:23.460 --> 01:45:28.460 overemphasized rigor over readiness and relevance

1973 01:45:28.650 --> 01:45:33.060 and therefore many of these big studies,

1974 01:45:33.060 --> 01:45:35.490 including these examples that I've given,

1975 01:45:35.490 --> 01:45:38.910 have missed the boat in terms of policy.

1976 01:45:38.910 --> 01:45:43.910 So I might say, maybe we need to, if we have to choose,

1977 01:45:44.790 --> 01:45:47.910 and I've also given examples of studies and designs

1978 01:45:47.910 --> 01:45:51.793 that can maybe be used that could still be rigorous

1979 01:45:51.793 --> 01:45:55.860 and rapid, that if we have to choose,

1980 01:45:55.860 --> 01:45:57.989 maybe we need to go over to the other,

1981 01:45:57.989 --> 01:46:00.960 that the rigorous needs to be, let's say,

1982 01:46:00.960 --> 01:46:04.500 especially randomization needs to be softened up

1983 01:46:04.500 --> 01:46:06.510 a little bit so we can get,

1984 01:46:06.510 --> 01:46:09.843 we can contribute to policy decisions.

1985 01:46:13.110 --> 01:46:15.530 <v Speaker>Okay, thank you very much.</v>

1986 01:46:15.530 --> 01:46:17.310 There is another question.

1987 01:46:17.310 --> 01:46:21.060 What is the difference, if any,

1988 01:46:21.060 --> 01:46:24.011 between implementation science study

1989 01:46:24.011 --> 01:46:26.344 and implementation research?

1990 01:46:28.885 --> 01:46:31.050 <v Presenter>Yeah, I don't think there is a difference</v>

1991 01:46:31.050 --> 01:46:32.763 in my opinion.

1992 01:46:33.660 --> 01:46:36.000 You know, an implementation science study is a type

1993 01:46:36.000 --> 01:46:39.240 of implementation research, but there's a lot

1994 01:46:39.240 --> 01:46:41.010 of terminology floating around.

1995 01:46:41.010 --> 01:46:43.558 So sometimes people say implementation research,

1996 01:46:43.558 --> 01:46:45.828 sometimes they say implementation science,

1997 01:46:45.828 --> 01:46:50.490 in the United States, a lot of people say D&I research,

1998 01:46:50.490 --> 01:46:52.680 dissemination and implementation research

1999 01:46:52.680 --> 01:46:56.490 because they wanna emphasize the dissemination piece more.

2000 01:46:56.490 --> 01:46:58.680 They feel like there's still inadequate uptake

2001 01:46:58.680 --> 01:47:01.200 and scale up and scale out of a lot

2002 01:47:01.200 --> 01:47:05.730 of evidence-based interventions for whom, you know,

2003 01:47:05.730 --> 01:47:09.960 acceptable implementation packages have been developed.

2004 01:47:09.960 --> 01:47:12.360 So these words, these various words are,

2005 01:47:12.360 --> 01:47:15.573 from my point of view, more or less synonymous.

2006 01:47:17.760 --> 01:47:19.315 <v Speaker>Oh, thank you very much.</v>

2007 01:47:19.315 --> 01:47:23.340 Another question is is there a difference

2008 01:47:23.340 --> 01:47:28.173 between clinical and implementation outcomes?

2009 01:47:29.070 --> 01:47:30.150 <v Presenter>Mm-hm. Yes.</v>

2010 01:47:30.150 --> 01:47:33.360 So I probably should have actually had one

2011 01:47:33.360 --> 01:47:34.787 or two slides about that,

2012 01:47:34.787 --> 01:47:37.005 'cause that's actually an important concept

2013 01:47:37.005 --> 01:47:38.700 in implementation science.

2014 01:47:38.700 --> 01:47:41.070 So I'm sorry I didn't talk more about that,

2015 01:47:41.070 --> 01:47:42.960 but thank you for the question.

2016 01:47:42.960 --> 01:47:46.740 So in, and it's related even to the cascade

2017 01:47:46.740 --> 01:47:51.740 on my very first slide, where we go from efficacy research,

2018 01:47:52.579 --> 01:47:56.160 has clinical endpoints, that's it.

2019 01:47:56.160 --> 01:47:57.900 Effectiveness research

2020 01:47:57.900 --> 01:48:02.125 usually has clinical endpoints, that's it.

2021 01:48:02.125 --> 01:48:04.620 Then we get to implementation research,

2022 01:48:04.620 --> 01:48:06.570 we start to have implementation outcomes

2023 01:48:06.570 --> 01:48:09.270 where we're not actually even looking at the impact

2024 01:48:09.270 --> 01:48:11.820 of the intervention on the health endpoints.

2025 01:48:11.820 --> 01:48:14.340 We're looking at the impact of the intervention

2026 01:48:14.340 --> 01:48:16.950 on how the evidence-based intervention

2027 01:48:16.950 --> 01:48:20.910 is being implemented with the idea that the actual

2028 01:48:20.910 --> 01:48:24.360 public health barrier at this point in time is not

2029 01:48:24.360 --> 01:48:27.210 like discovering a new intervention,

2030 01:48:27.210 --> 01:48:32.210 it's rolling out an existing intervention that's useful,

2031 01:48:32.400 --> 01:48:35.640 and that's where the type 1, 2 and 3 hybrid designs

2032 01:48:35.640 --> 01:48:38.700 come in, where in a type 3 hybrid design you would

2033 01:48:38.700 --> 01:48:40.980 just look at, is the safe childbirth,

2034 01:48:40.980 --> 01:48:44.726 is the uptake of the safe childbirth checklist,

2035 01:48:44.726 --> 01:48:47.490 has that increased?

2036 01:48:47.490 --> 01:48:49.770 We're not looking to see, did fewer mothers die?

2037 01:48:49.770 --> 01:48:50.880 Did fewer babies die?

2038 01:48:50.880 --> 01:48:54.300 We know, if these 27 things have been done,

2039 01:48:54.300 --> 01:48:57.000 fewer mothers and fewer babies are gonna die.

2040 01:48:57.000 --> 01:49:02.000 So we just wanna get more providers using these 27 things.

2041 01:49:03.000 --> 01:49:05.103 So that's pure implementation outcome.

2042 01:49:07.560 --> 01:49:10.671 <v Speaker>Well, thank you very much.</v>

2043 01:49:10.671 --> 01:49:14.100 I think the last one here or there's one about how do

2044 01:49:14.100 --> 01:49:19.100 we calculate the sample size for these designs.

2045 01:49:19.500 --> 01:49:24.090 I wonder how that will be addressed,

2046 01:49:24.090 --> 01:49:26.649 but that's the question. <v ->Okay.</v>

2047 01:49:26.649 --> 01:49:30.450 So that could be another like one or two hour talk

2048 01:49:30.450 --> 01:49:33.630 or even a whole class in itself.

2049 01:49:33.630 --> 01:49:37.680 But I can say a few basic principles is if you know

2050 01:49:37.680 --> 01:49:40.680 how to calculate, say, a study,

2051 01:49:40.680 --> 01:49:42.300 let's say, I'll just say

2052 01:49:42.300 --> 01:49:46.999 for a cluster-randomized trial compared

2053 01:49:46.999 --> 01:49:49.161 to an individually randomized trial,

2054 01:49:49.161 --> 01:49:51.630 you can do the sample size calculation

2055 01:49:51.630 --> 01:49:53.700 for the individually randomized trial.

2056 01:49:53.700 --> 01:49:55.020 And there's even like, you know,

2057 01:49:55.020 --> 01:49:57.240 in most statistics textbooks,

2058 01:49:57.240 --> 01:50:00.720 you know even basic statistics 101 type courses,

2059 01:50:00.720 --> 01:50:04.978 you'll see the formula for power or sample size

2060 01:50:04.978 --> 01:50:08.993 for a test for the difference between two sample means

2061 01:50:08.993 --> 01:50:13.140 or two proportions in two groups.

2062 01:50:13.140 --> 01:50:16.470 You can do that sample size or power calculation

2063 01:50:16.470 --> 01:50:20.703 and then adjust it by what's called the design factor,

2064 01:50:21.720 --> 01:50:24.120 takes clustering into account.

2065 01:50:24.120 --> 01:50:28.080 And the design factor also is a very simple, you know,

2066 01:50:28.080 --> 01:50:30.573 it's like one plus the number of clusters minus one

2067 01:50:30.573 --> 01:50:34.300 times the intraclass correlation coefficient

2068 01:50:35.280 --> 01:50:38.153 and you multiply the sample size by that,

2069 01:50:38.153 --> 01:50:41.040 or I don't remember the exact details actually, I'm sorry,

2070 01:50:41.040 --> 01:50:43.770 I don't wanna give a wrong formula and I don't remember

2071 01:50:43.770 --> 01:50:45.240 it off the top of my head.

2072 01:50:45.240 --> 01:50:47.765 But you can modify, without a computer,

2073 01:50:47.765 --> 01:50:49.665 just using a hand calculation,

2074 01:50:49.665 --> 01:50:53.190 you can modify a sample size calculation

2075 01:50:53.190 --> 01:50:55.140 for an individually randomized trial

2076 01:50:55.140 --> 01:50:57.827 with this design factor that only takes,

2077 01:50:57.827 --> 01:51:01.890 that all it needs to calculate it is the number

2078 01:51:01.890 --> 01:51:05.220 of clusters and the intraclass correlation coefficient.

2079 01:51:05.220 --> 01:51:08.550 And then you get your new sample size or your new

2080 01:51:08.550 --> 01:51:11.703 power for your cluster-randomized trial.

2081 01:51:13.763 --> 01:51:15.690 There are also, in R,

2082 01:51:15.690 --> 01:51:19.830 there are R packages for doing these kinds of calculations

2083 01:51:19.830 --> 01:51:21.300 for stepped wedge designs

2084 01:51:21.300 --> 01:51:23.190 and for cluster-randomized trials.

2085 01:51:23.190 --> 01:51:27.630 In fact we have an R package that calculates sample

2086 01:51:27.630 --> 01:51:31.050 size and power for a whole bunch of different

2087 01:51:31.050 --> 01:51:34.320 variations of step wedge designs with continuous

2088 01:51:34.320 --> 01:51:38.806 outcomes and binary outcomes and repeated measures

2089 01:51:38.806 --> 01:51:40.140 and all sorts of things.

2090 01:51:40.140 --> 01:51:45.140 It's called SWD_PWR, stepped wedge design power

2091 01:51:46.064 --> 01:51:50.374 and it's an R package that's freely available to everybody.

2092 01:51:50.374 --> 01:51:52.290 So that's just a little bit

2093 01:51:52.290 --> 01:51:57.290 about how to do this and what's involved.

2094 01:51:59.640 --> 01:52:00.603 <v Speaker>Yeah, thank you.</v>

2095 01:52:00.603 --> 01:52:04.620 I think I'll just take two more questions.

2096 01:52:04.620 --> 01:52:09.620 There's one that is quite important and I think

2097 01:52:11.520 --> 01:52:16.520 would also help Donna to see how she can help us

2098 01:52:16.950 --> 01:52:19.440 for that, especially those who are interested

2099 01:52:19.440 --> 01:52:22.020 in implementation research.

2100 01:52:22.020 --> 01:52:25.800 The comment says, there is generally poor knowledge

2101 01:52:25.800 --> 01:52:29.753 of implementation research among low to medium

2102 01:52:32.640 --> 01:52:36.450 middle income countries researchers

2103 01:52:36.450 --> 01:52:38.880 as evidenced especially by the number

2104 01:52:38.880 --> 01:52:40.620 of publications in Africa.

2105 01:52:40.620 --> 01:52:44.370 Where can one get specific training opportunities

2106 01:52:44.370 --> 01:52:47.583 in implementation science research.

2107 01:52:49.260 --> 01:52:52.590 <v Presenter>Yeah, so that is an extremely important point,</v>

2108 01:52:52.590 --> 01:52:56.347 and I can tell you a few things about this.

2109 01:52:56.347 --> 01:52:59.250 The first one is, I'm pretty sure

2110 01:52:59.250 --> 01:53:03.390 that there's a West African Implementation Science Society.

2111 01:53:03.390 --> 01:53:06.753 Is there anybody on this call who's a part of this society?

2112 01:53:08.375 --> 01:53:11.416 <v Speaker>Yeah, CAWISA, there's CAWISA and there's NISA</v>

2113 01:53:11.416 --> 01:53:12.749 in Nigeria also.

2114 01:53:15.030 --> 01:53:15.863 <v ->Yeah, so I don't know,</v>

2115 01:53:15.863 --> 01:53:19.620 would you like to say something about that and

2116 01:53:19.620 --> 01:53:21.090 what the society is doing,

2117 01:53:21.090 --> 01:53:23.413 at least in the West African context,

2118 01:53:23.413 --> 01:53:27.180 in terms of promoting implementation science,

2119 01:53:27.180 --> 01:53:29.787 supporting new researchers at implementation science

2120 01:53:29.787 --> 01:53:30.933 and so forth?

2121 01:53:32.340 --> 01:53:33.720 <v Audience Member>I know that NISA</v>

2122 01:53:33.720 --> 01:53:37.110 holds an annual conference on implementation science

2123 01:53:37.110 --> 01:53:41.340 in Abuja, I've been, I've attended that before.

2124 01:53:41.340 --> 01:53:44.940 I'm very aware that CAWISA is Central and West Africa

2125 01:53:44.940 --> 01:53:47.610 and they currently are expanding.

2126 01:53:47.610 --> 01:53:51.690 I think they have six countries

2127 01:53:51.690 --> 01:53:54.040 in their court and they're currently expanding.

2128 01:53:55.866 --> 01:54:00.073 I could send to, the details of, you know,

2129 01:54:01.669 --> 01:54:04.440 the two organizations who do training,

2130 01:54:04.440 --> 01:54:07.740 therefore they have NIH grant I think to support...

2131 01:54:07.740 --> 01:54:10.650 Yes, they do have one or two NIH grants

2132 01:54:10.650 --> 01:54:12.544 to support implementation.

2133 01:54:12.544 --> 01:54:16.830 They just received a grant 443 to do it.

2134 01:54:16.830 --> 01:54:18.813 <v Presenter>Wow. Wonderful.</v>

2135 01:54:20.587 --> 01:54:22.107 <v Speaker>Thank you very much.</v>

2136 01:54:22.107 --> 01:54:25.637 I believe that is Professor Bavanela.

2137 01:54:25.637 --> 01:54:28.372 <v ->My name is-</v> <v ->That is professor-</v>

2138 01:54:28.372 --> 01:54:31.960 <v ->Oh. Sorry-</v> <v ->She's my friend.</v>

2139 01:54:33.064 --> 01:54:36.540 <v ->Okay. (laughs)</v>

2140 01:54:36.540 --> 01:54:40.459 Okay. Could you just type the names of the societies?

2141 01:54:40.459 --> 01:54:41.292 <v Presenter>Yeah, can I get the link?</v>

2142 01:54:41.292 --> 01:54:45.980 <v Speaker>Maybe give the others hint on this. Thank you.</v>

2143 01:54:47.377 --> 01:54:50.768 <v ->Okay. So that's one thing-</v> <v ->In the chat.</v>

2144 01:54:50.768 --> 01:54:52.101 Yeah, so, go on.

2145 01:54:53.013 --> 01:54:58.013 <v Presenter>And I know that the World Health Organization</v>

2146 01:54:59.040 --> 01:55:04.040 has an implementation science academy that's focused on,

2147 01:55:04.920 --> 01:55:08.280 there's one that's more focused on infectious disease

2148 01:55:08.280 --> 01:55:11.471 and then there's one that's focused on chronic disease.

2149 01:55:11.471 --> 01:55:14.250 But I don't have the links for either of those.

2150 01:55:14.250 --> 01:55:16.740 I'm not sure if there's anybody on this call

2151 01:55:16.740 --> 01:55:20.183 who's participated in either one and they're,

2152 01:55:20.183 --> 01:55:22.883 I know the chronic disease one, I'm pretty sure,

2153 01:55:22.883 --> 01:55:26.310 is done in the summer and I don't remember

2154 01:55:26.310 --> 01:55:28.770 if before COVID it might have been

2155 01:55:28.770 --> 01:55:32.280 that people had to apply and go to Geneva, but maybe

2156 01:55:32.280 --> 01:55:35.370 now it's done by Zoom and it can be more inclusive.

2157 01:55:35.370 --> 01:55:38.280 I'm not really sure but I'm wondering if there's anyone

2158 01:55:38.280 --> 01:55:43.280 on the call who is involved with either of those trainings

2159 01:55:43.350 --> 01:55:44.703 that are connected to WHO.

2160 01:55:51.711 --> 01:55:53.340 <v Speaker>I guess please,</v>

2161 01:55:53.340 --> 01:55:58.340 let me advise our participants to actually use the Google.

2162 01:55:59.700 --> 01:56:02.558 You can type this in the Google and get some

2163 01:56:02.558 --> 01:56:05.289 of the resources.

2164 01:56:05.289 --> 01:56:10.289 There are some training programs too.

2165 01:56:10.620 --> 01:56:14.610 I know the NIH also have the implementation

2166 01:56:14.610 --> 01:56:19.290 science training program and we can,

2167 01:56:19.290 --> 01:56:21.990 I mean you can actually apply for it. It is online.

2168 01:56:21.990 --> 01:56:24.972 And then in December- <v ->Didn't you do that, Ike?</v>

2169 01:56:24.972 --> 01:56:27.490 <v Speaker>You join the group. Yeah, that one.</v>

2170 01:56:27.490 --> 01:56:31.800 <v ->Didn't you do that one?</v> <v ->Yes, I did. I did that.</v>

2171 01:56:31.800 --> 01:56:33.420 <v Speaker>Maybe you could say a little bit more-</v>

2172 01:56:33.420 --> 01:56:35.490 <v Speaker>The conference.</v>

2173 01:56:35.490 --> 01:56:37.200 <v Presenter>Yeah, maybe you could say a little bit more</v>

2174 01:56:37.200 --> 01:56:39.330 about what was involved because that was a pretty

2175 01:56:39.330 --> 01:56:43.390 in-depth training I think that you were able to access.

2176 01:56:43.390 --> 01:56:46.980 <v Speaker>Yes, it was actually for about three months</v>

2177 01:56:46.980 --> 01:56:51.980 or so and we had the training online,

2178 01:56:52.140 --> 01:56:56.700 and we had exercises,

2179 01:56:56.700 --> 01:57:01.700 assignments and we had also facilitators

2180 01:57:04.560 --> 01:57:09.060 or resource courses for the different lectures,

2181 01:57:09.060 --> 01:57:13.833 and a lot was given on the theories.

2182 01:57:15.210 --> 01:57:19.560 I mean they really went in depth so that they were

2183 01:57:19.560 --> 01:57:24.000 well grounded in the theory of implementation science.

2184 01:57:24.000 --> 01:57:27.510 And then the various examples.

2185 01:57:27.510 --> 01:57:31.780 And this was capped by a meeting

2186 01:57:33.453 --> 01:57:37.950 in Washington and there, there was

2187 01:57:37.950 --> 01:57:42.780 a conference and we also had some sessions,

2188 01:57:42.780 --> 01:57:47.780 small group sessions and I mean

2189 01:57:47.820 --> 01:57:49.980 just to experience

2190 01:57:49.980 --> 01:57:54.980 the different kinds of implementation research

2191 01:57:54.990 --> 01:57:58.890 that has been carried out and it was quite helpful.

2192 01:57:58.890 --> 01:58:03.890 So I guess with the emails we have, but like you said,

2193 01:58:04.170 --> 01:58:08.695 you can just Google and you can actually access all

2194 01:58:08.695 --> 01:58:11.739 of this, and like Donna said,

2195 01:58:11.739 --> 01:58:15.630 there is also this WHO implementation science

2196 01:58:15.630 --> 01:58:18.660 training that's also free.

2197 01:58:18.660 --> 01:58:19.543 And so we can,

2198 01:58:19.543 --> 01:58:23.698 I mean you can access all of this at some point,

2199 01:58:23.698 --> 01:58:28.698 but you can get back to me if you need further

2200 01:58:29.040 --> 01:58:30.570 information on this.

2201 01:58:30.570 --> 01:58:35.400 And we have also heard about others who can help.

2202 01:58:35.400 --> 01:58:40.352 So if we get that, the names of the society organizations,

2203 01:58:40.352 --> 01:58:45.352 it'll also help us to link a network amongst ourselves

2204 01:58:46.080 --> 01:58:50.560 on this implementation science and implementation research

2205 01:58:51.720 --> 01:58:55.883 across the continent and even the group.

2206 01:58:55.883 --> 01:58:59.957 So the lot of network is there for us.

2207 01:59:00.840 --> 01:59:03.240 I have to keep raising up their hands.

2208 01:59:03.240 --> 01:59:07.200 I have to allow them before we end this,

2209 01:59:07.200 --> 01:59:11.880 I have Dr. William and I have... (indistinct)

2210 01:59:11.880 --> 01:59:16.323 Dr. William, please let it be brief. Thank you.

2211 01:59:17.219 --> 01:59:18.501 Dr. William?

2212 01:59:18.501 --> 01:59:21.833 <v Presenter>I better tell Dr. Spigelman that too.</v>

2213 01:59:21.833 --> 01:59:23.375 <v Speaker>Pardon me. Donna?</v>

2214 01:59:23.375 --> 01:59:25.350 <v Presenter>I said you better tell Dr. Spigelman</v>

2215 01:59:25.350 --> 01:59:29.070 let it be brief also. (laughs)

2216 01:59:29.070 --> 01:59:30.180 I'm just joking.

2217 01:59:30.180 --> 01:59:31.284 <v ->Hello?</v> <v ->Okay.</v>

2218 01:59:31.284 --> 01:59:33.180 <v Speaker>Hello. Good evening.</v>

2219 01:59:33.180 --> 01:59:35.999 <v Speaker>Hello Dr. Is that Dr. William? Yeah, thank you.</v>

2220 01:59:35.999 --> 01:59:37.936 <v Speaker>Yes. Good evening, ma'am.</v>

2221 01:59:37.936 --> 01:59:39.838 <v ->Yeah we are hearing you.</v> <v ->Good evening, ma'am.</v>

2222 01:59:39.838 --> 01:59:43.590 <v ->Yes, we're hearing you.</v> <v ->Good evening. Hello.</v>

2223 01:59:43.590 --> 01:59:47.820 <v Speaker>Yeah, the lecture is awesome.</v>

2224 01:59:47.820 --> 01:59:51.750 I had a lot of new things that were,

2225 01:59:51.750 --> 01:59:56.750 was being taught but my question majorly is concerning

2226 01:59:58.440 --> 02:00:03.440 the hybrid research that you mentioned

2227 02:00:03.810 --> 02:00:07.140 that it is the same thing as mixed method research

2228 02:00:07.140 --> 02:00:12.140 and that since HIV is the chronic disease now,

2229 02:00:14.010 --> 02:00:19.010 would is it be better to do the research that you want

2230 02:00:20.190 --> 02:00:23.010 to do in East Africa, that's in Uganda, also

2231 02:00:23.010 --> 02:00:27.773 in West Africa also to see if there are changes in the,

2232 02:00:27.773 --> 02:00:29.757 though there are both flat,

2233 02:00:29.757 --> 02:00:34.450 but the different terrains and all that who also help

2234 02:00:36.956 --> 02:00:37.860 in managing the patient.

2235 02:00:37.860 --> 02:00:42.273 So those are the issues I have. So, thank you.

2236 02:00:43.800 --> 02:00:44.633 <v Presenter>Great.</v>

2237 02:00:44.633 --> 02:00:47.333 So I'm glad you asked that question.

2238 02:00:47.333 --> 02:00:52.290 Hybrid designs and mixed methods are not the same thing.

2239 02:00:52.290 --> 02:00:56.520 So hybrid designs are, well, let me say,

2240 02:00:56.520 --> 02:00:58.950 mixed methods, which I didn't really talk about.

2241 02:00:58.950 --> 02:01:01.589 That's another thing I could have actually included

2242 02:01:01.589 --> 02:01:02.760 in this talk.

2243 02:01:02.760 --> 02:01:06.376 But mixed methods involve the mixing of qualitative

2244 02:01:06.376 --> 02:01:11.273 and quantitative research along the entire study process.

2245 02:01:11.273 --> 02:01:14.610 And there's different types of mixed methods

2246 02:01:14.610 --> 02:01:18.060 designs depending on what's considered to be

2247 02:01:18.060 --> 02:01:21.180 more important, the qualitative or the quantitative.

2248 02:01:21.180 --> 02:01:23.040 So like you could say, the MOST design,

2249 02:01:23.040 --> 02:01:25.830 which I did talk about is a mixed method design,

2250 02:01:25.830 --> 02:01:28.750 because phase one of the MOST design

2251 02:01:30.030 --> 02:01:31.800 at least has a qualitative component.

2252 02:01:31.800 --> 02:01:36.420 We use qualitative data to kind of narrow down

2253 02:01:36.420 --> 02:01:38.584 the intervention package components.

2254 02:01:38.584 --> 02:01:42.240 But then we'd use quantitative data in phase two

2255 02:01:42.240 --> 02:01:45.810 in MOST to further weed them down to what we're gonna

2256 02:01:45.810 --> 02:01:47.904 use for the intervention we're gonna roll

2257 02:01:47.904 --> 02:01:49.500 out in the full trial.

2258 02:01:49.500 --> 02:01:54.270 But it's recommended, and even though I have really

2259 02:01:54.270 --> 02:01:56.670 almost no social science training,

2260 02:01:56.670 --> 02:02:00.210 I've come to deeply appreciate and value the role

2261 02:02:00.210 --> 02:02:02.918 of social scientists in implementation science.

2262 02:02:02.918 --> 02:02:06.058 And I would say that we need qualitative research

2263 02:02:06.058 --> 02:02:09.816 along with quantitative along the entire like pathway

2264 02:02:09.816 --> 02:02:13.050 from qualitative and quantitative data

2265 02:02:13.050 --> 02:02:16.472 about what is and isn't working about the intervention

2266 02:02:16.472 --> 02:02:20.010 if it's been in place or what people think

2267 02:02:20.010 --> 02:02:23.940 about a new kind of way of adapting the intervention

2268 02:02:23.940 --> 02:02:25.650 to a new situation.

2269 02:02:25.650 --> 02:02:27.540 And then you kind of roll out your trial,

2270 02:02:27.540 --> 02:02:29.370 whatever kind of trial you have.

2271 02:02:29.370 --> 02:02:31.350 And then while the trial's going on,

2272 02:02:31.350 --> 02:02:33.810 it's really important to collect qualitative data

2273 02:02:33.810 --> 02:02:38.810 because if it doesn't work, we wanna know why.

2274 02:02:39.330 --> 02:02:42.300 So like in the BetterBirth study that I mentioned,

2275 02:02:42.300 --> 02:02:44.188 because it wasn't a mixed method study,

2276 02:02:44.188 --> 02:02:48.810 we have no idea why there was this failure to take up

2277 02:02:48.810 --> 02:02:50.610 the Safe Childbirth Checklist.

2278 02:02:50.610 --> 02:02:54.500 Was it that the turnover of staff was too high

2279 02:02:54.500 --> 02:02:56.837 or the supply is not in the facilities?

2280 02:02:56.837 --> 02:02:59.752 I mean there's just so many reasons, we have no idea.

2281 02:02:59.752 --> 02:03:03.210 So the qualitative piece while the study is going on

2282 02:03:03.210 --> 02:03:04.620 is really important.

2283 02:03:04.620 --> 02:03:06.870 And then you do your quantitative evaluation

2284 02:03:06.870 --> 02:03:08.280 of your endpoints.

2285 02:03:08.280 --> 02:03:11.490 And then a lot of people advocate, after that,

2286 02:03:11.490 --> 02:03:14.550 further qualitative data collection to find out

2287 02:03:14.550 --> 02:03:16.470 what people thought of the intervention,

2288 02:03:16.470 --> 02:03:19.410 what suggestions they have for improvement,

2289 02:03:19.410 --> 02:03:21.477 what they think the next step might be in terms

2290 02:03:21.477 --> 02:03:23.940 of scale up or scale out.

2291 02:03:23.940 --> 02:03:27.480 And so you'd have qualitative and quantitative trading

2292 02:03:27.480 --> 02:03:30.090 off along the whole continuum.

2293 02:03:30.090 --> 02:03:34.770 And then also there's also formal ways of doing

2294 02:03:34.770 --> 02:03:38.836 mixed methods analysis where, when you evaluate outcomes,

2295 02:03:38.836 --> 02:03:42.296 you actually integrate the qualitative

2296 02:03:42.296 --> 02:03:45.176 and quantitative data in some formal ways

2297 02:03:45.176 --> 02:03:47.400 that I know exist,

2298 02:03:47.400 --> 02:03:50.490 I haven't actually had the opportunity to do that yet.

2299 02:03:50.490 --> 02:03:52.170 And so I'm looking forward to learning more

2300 02:03:52.170 --> 02:03:54.180 about how to do that.

2301 02:03:54.180 --> 02:03:56.940 So that's very different now I hope you can see

2302 02:03:56.940 --> 02:04:01.080 from the hybrid design where we have a standard quantitative

2303 02:04:01.080 --> 02:04:04.973 study design like a CRT or a stepped wedge design

2304 02:04:04.973 --> 02:04:07.550 and the hybrid design is just more about,

2305 02:04:07.550 --> 02:04:10.843 is the primary outcome, health outcome,

2306 02:04:10.843 --> 02:04:13.410 a health outcome and an implementation outcome

2307 02:04:13.410 --> 02:04:15.933 or an implementation outcome only?

2308 02:04:20.370 --> 02:04:22.447 <v ->Okay, thank you, Donna.</v>

2309 02:04:22.447 --> 02:04:24.947 (indistinct)

2310 02:04:26.726 --> 02:04:28.960 <v Speaker>Yeah, thank you. Thank you very much.</v>

2311 02:04:28.960 --> 02:04:32.104 <v Speaker>One of the universities in Nigeria.</v>

2312 02:04:32.104 --> 02:04:33.547 <v ->It's all right.</v> <v ->You're welcome.</v>

2313 02:04:33.547 --> 02:04:36.910 <v Speaker>It's all right. Thank you very much.</v>

2314 02:04:36.910 --> 02:04:40.800 Professor Donna, Professor Ajayi and everybody here.

2315 02:04:40.800 --> 02:04:42.780 <v ->Thank you.</v> <v ->My network,</v>

2316 02:04:42.780 --> 02:04:45.393 I was on the road so my network was off and on.

2317 02:04:46.463 --> 02:04:50.010 I started hearing, listening to implementation science

2318 02:04:50.010 --> 02:04:55.010 I think around 2016 at NIH and one the last speakers

2319 02:04:55.471 --> 02:04:58.857 spoke about, showed up when they draw the map,

2320 02:04:58.857 --> 02:05:01.110 it was still new then,

2321 02:05:01.110 --> 02:05:05.160 you would just see a lot of studies on East Africa,

2322 02:05:05.160 --> 02:05:08.407 hardly anything in West Africa.

2323 02:05:08.407 --> 02:05:11.820 You know, I'm just trying to look at the gaps

2324 02:05:11.820 --> 02:05:14.048 that we need to be filling.

2325 02:05:14.048 --> 02:05:18.480 I'm challenging those of us present here and our speaker,

2326 02:05:18.480 --> 02:05:21.027 what really causes that?

2327 02:05:21.027 --> 02:05:24.600 There's not a balance.

2328 02:05:24.600 --> 02:05:29.340 You see a lot of studies on East African coast

2329 02:05:29.340 --> 02:05:31.200 and very minimal...

2330 02:05:31.200 --> 02:05:33.120 That's one thing I observed.

2331 02:05:33.120 --> 02:05:37.050 Secondly, each time I go for these meetings,

2332 02:05:37.050 --> 02:05:41.070 with all due respect, you are talking about trials,

2333 02:05:41.070 --> 02:05:43.140 you're talking about these implementations,

2334 02:05:43.140 --> 02:05:44.910 hospitals, everything.

2335 02:05:44.910 --> 02:05:48.630 We hardly see those who handle these drugs.

2336 02:05:48.630 --> 02:05:52.920 We hardly see, I mean I'd love multidisciplinary research,

2337 02:05:52.920 --> 02:05:54.150 that's why I'm here.

2338 02:05:54.150 --> 02:05:55.962 I believe in it.

2339 02:05:55.962 --> 02:05:59.250 But we hardly, it could be the fault of the,

2340 02:05:59.250 --> 02:06:02.460 those drug handlers, the pharmacies,

2341 02:06:02.460 --> 02:06:04.200 those that handle drugs.

2342 02:06:04.200 --> 02:06:07.290 Because I was in another group with Harvard on malaria

2343 02:06:07.290 --> 02:06:08.160 and it's the same thing.

2344 02:06:08.160 --> 02:06:09.030 They were even shocked.

2345 02:06:09.030 --> 02:06:10.980 They say you are the only pharmacist we've seen

2346 02:06:10.980 --> 02:06:13.397 in this thing and you're talking about medicines,

2347 02:06:13.397 --> 02:06:16.140 and they're not involved, in the hospitals,

2348 02:06:16.140 --> 02:06:20.640 when I listen to them, they don't even want to mention them.

2349 02:06:20.640 --> 02:06:25.640 So we should really be looking at involving everybody

2350 02:06:26.228 --> 02:06:29.730 in this healthcare sector for the implementation

2351 02:06:29.730 --> 02:06:30.563 to work in.

2352 02:06:30.563 --> 02:06:35.035 In terms of community pharmacists, they do a lot in Africa.

2353 02:06:35.035 --> 02:06:38.100 They really need to be brought on board.

2354 02:06:38.100 --> 02:06:39.180 They do a whole lot.

2355 02:06:39.180 --> 02:06:43.380 They're the (indistinct) when they're ill.

2356 02:06:43.380 --> 02:06:47.700 So we should look at those gaps and fill the skill sets

2357 02:06:47.700 --> 02:06:49.110 in that area.

2358 02:06:49.110 --> 02:06:53.760 And then finally is

2359 02:06:53.760 --> 02:06:56.880 that all these other websites

2360 02:06:56.880 --> 02:07:00.150 and all that, it would be good for those of us here,

2361 02:07:00.150 --> 02:07:04.980 maybe or Professor Ajayi to really do certification,

2362 02:07:04.980 --> 02:07:07.710 social certification courses on these things

2363 02:07:07.710 --> 02:07:11.070 so that we will be well trained.

2364 02:07:11.070 --> 02:07:13.142 It's obvious that you need a lot of statistics.

2365 02:07:13.142 --> 02:07:15.090 Some of us may not be good

2366 02:07:15.090 --> 02:07:19.110 as why multidisciplinary approach is very important.

2367 02:07:19.110 --> 02:07:21.603 Well, thank you very much for everything.

2368 02:07:24.180 --> 02:07:26.657 <v ->Thank you.</v> <v ->Oh thank you very much.</v>

2369 02:07:26.657 --> 02:07:29.806 <v ->I think it'll be more interesting just ahead.</v>

2370 02:07:29.806 --> 02:07:30.960 <v Speaker>Okay. Donna, I'm with you.</v>

2371 02:07:30.960 --> 02:07:32.010 <v ->Oh, okay.</v>

2372 02:07:32.010 --> 02:07:35.910 Well, I think these comments are probably best

2373 02:07:35.910 --> 02:07:40.410 discussed by the many participants on this call more

2374 02:07:40.410 --> 02:07:44.760 than me, 'cause they have to do with, you know,

2375 02:07:44.760 --> 02:07:46.571 the role of implementation science

2376 02:07:46.571 --> 02:07:50.077 in West Africa and what are the questions,

2377 02:07:50.077 --> 02:07:51.540 and some of them,

2378 02:07:51.540 --> 02:07:55.684 the only thing I would just say one small observation that,

2379 02:07:55.684 --> 02:08:00.330 you know, it's an unintended consequence

2380 02:08:00.330 --> 02:08:02.010 of the fact that, you know,

2381 02:08:02.010 --> 02:08:04.521 I think, to some extent the issue you're bringing up

2382 02:08:04.521 --> 02:08:08.580 is because HIV rates

2383 02:08:08.580 --> 02:08:13.350 were so much lower in West Africa than East Africa.

2384 02:08:13.350 --> 02:08:16.080 So there was so much funding being poured

2385 02:08:16.080 --> 02:08:19.140 into East Africa in terms of mitigation

2386 02:08:19.140 --> 02:08:21.660 of the HIV AIDS epidemic.

2387 02:08:21.660 --> 02:08:24.540 And then now as the epidemic has lessened,

2388 02:08:24.540 --> 02:08:27.858 it's starting to evolve into some of these other topics.

2389 02:08:27.858 --> 02:08:30.796 Whereas in West Africa there just wasn't as much

2390 02:08:30.796 --> 02:08:33.390 because luckily the AIDS epidemic was

2391 02:08:33.390 --> 02:08:35.673 just so much less severe.

2392 02:08:39.660 --> 02:08:42.090 <v ->Yeah, thank you very much for that response.</v>

2393 02:08:42.090 --> 02:08:45.878 And I think it is a challenge also to researchers

2394 02:08:45.878 --> 02:08:48.378 in this part of the continent.

2395 02:08:49.344 --> 02:08:51.193 <v ->I know.</v> <v ->And with this lecture</v>

2396 02:08:51.193 --> 02:08:53.010 I think we should start

2397 02:08:53.010 --> 02:08:57.930 thinking of materials opportunities that are

2398 02:08:57.930 --> 02:09:01.191 there for us to tap into.

2399 02:09:01.191 --> 02:09:04.374 So thank you very much, (indistinct)

2400 02:09:04.374 --> 02:09:07.102 for that observation and I think

2401 02:09:07.102 --> 02:09:12.102 we should try and bridge the gap and come up with...

2402 02:09:12.427 --> 02:09:14.844 (indistinct)

2403 02:09:18.840 --> 02:09:20.227 <v ->Please.</v>

2404 02:09:20.227 --> 02:09:24.300 So I think we need to really round up,

2405 02:09:24.300 --> 02:09:29.300 I want to mention that Donna actually moved

2406 02:09:29.520 --> 02:09:31.530 from one lecture to ours.

2407 02:09:31.530 --> 02:09:33.210 So we are really very,

2408 02:09:33.210 --> 02:09:37.440 very grateful because we know by now you should be

2409 02:09:37.440 --> 02:09:42.440 resting from the various assignments you had all morning.

2410 02:09:44.160 --> 02:09:48.401 So to Randolph, Donna, I've just observed

2411 02:09:48.401 --> 02:09:53.401 we're wearing the, our clothes are of the same color.

2412 02:09:53.886 --> 02:09:58.750 <v ->I know, I noticed it also. It's kind of amazing.</v>

2413 02:09:58.750 --> 02:10:01.560 <v Speaker>Oh, what a coincidence. I'm so happy.</v>

2414 02:10:01.560 --> 02:10:02.393 <v ->I know.</v>

2415 02:10:02.393 --> 02:10:06.114 <v ->And that means I need to come back there soon.</v>

2416 02:10:06.114 --> 02:10:09.202 <v ->Yeah, that'd be great. That would be wonderful.</v>

2417 02:10:09.202 --> 02:10:10.690 <v ->Thank you very much.</v>

2418 02:10:10.690 --> 02:10:15.593 So we have Dr. Kiemi who is going to do the vote of thanks

2419 02:10:15.593 --> 02:10:19.920 on behalf of the Institute for Advanced Medical Research

2420 02:10:19.920 --> 02:10:20.883 and Training.

2421 02:10:22.170 --> 02:10:26.313 So Dr. Kiemi, are you there?

2422 02:10:28.020 --> 02:10:30.510 <v ->Yes, I am.</v> <v ->Okay, please,</v>

2423 02:10:30.510 --> 02:10:32.553 the floor is yours now, thank you.

2424 02:10:33.450 --> 02:10:36.540 <v ->Right, thank you very much,</v>

2425 02:10:36.540 --> 02:10:41.540 Professor Donna Spiegelman, for a very exciting

2426 02:10:41.625 --> 02:10:44.703 and illuminating lecture on implementation science.

2427 02:10:46.290 --> 02:10:47.880 In this vote of thanks,

2428 02:10:47.880 --> 02:10:51.720 I just like to say that this lecture is coming

2429 02:10:51.720 --> 02:10:56.720 just at the heels of an African summit

2430 02:10:56.730 --> 02:10:58.473 that we had just last week.

2431 02:10:59.730 --> 02:11:03.270 And one of the strong takes of that summit was

2432 02:11:03.270 --> 02:11:07.860 that we need implementation science to reduce burden

2433 02:11:07.860 --> 02:11:09.183 of stroke in Africa.

2434 02:11:10.140 --> 02:11:13.445 We discovered that in Africa only 7%

2435 02:11:13.445 --> 02:11:16.205 of hypertensives are controlled.

2436 02:11:16.205 --> 02:11:19.020 And that begs the question of the need

2437 02:11:19.020 --> 02:11:21.900 of interpretation science to, you know,

2438 02:11:22.850 --> 02:11:26.640 to improve awareness about hypertension and, you know,

2439 02:11:26.640 --> 02:11:31.230 and other risk factors and to improve optic

2440 02:11:31.230 --> 02:11:35.550 of hypertensives to enhance control of hypertension,

2441 02:11:35.550 --> 02:11:38.010 and of course to our body.

2442 02:11:38.010 --> 02:11:40.830 So it's very germane to the field

2443 02:11:40.830 --> 02:11:43.920 of non-communicative diseases on the continent.

2444 02:11:43.920 --> 02:11:47.130 And I'm sure you wouldn't mind partnering with us

2445 02:11:47.130 --> 02:11:48.533 in the years ahead, you know,

2446 02:11:48.533 --> 02:11:52.320 to undertake implementation science research in reducing

2447 02:11:52.320 --> 02:11:55.140 the burden of stroke in Africa.

2448 02:11:55.140 --> 02:11:56.510 So on that note, I'd like to,

2449 02:11:56.510 --> 02:11:58.956 on behalf of the director

2450 02:11:58.956 --> 02:12:00.867 of the Institute for Advanced Medical Research

2451 02:12:00.867 --> 02:12:04.710 and Training College of Medicine... (indistinct)

2452 02:12:04.710 --> 02:12:08.787 I'd like to say very big thank you for the time

2453 02:12:08.787 --> 02:12:13.140 you have invested in sharing with us these deep

2454 02:12:13.140 --> 02:12:17.250 thoughts from your profound wealth of experience

2455 02:12:17.250 --> 02:12:20.867 and knowledge in the field of implementation science.

2456 02:12:20.867 --> 02:12:25.260 Director, the entire staff and indeed the purpose

2457 02:12:25.260 --> 02:12:27.010 of the College of Medicine, and a time not

2458 02:12:27.010 --> 02:12:29.603 about the community and including colleagues

2459 02:12:29.603 --> 02:12:32.213 who have joined from other institutions in Nigeria,

2460 02:12:32.213 --> 02:12:35.658 across the continent, but they be grateful.

2461 02:12:35.658 --> 02:12:39.510 We trust, we hope to build on this foundational

2462 02:12:39.510 --> 02:12:43.200 knowledge and share with us to advance the field

2463 02:12:43.200 --> 02:12:44.790 across the continent.

2464 02:12:44.790 --> 02:12:47.190 Thank you very much and God bless.

2465 02:12:48.305 --> 02:12:50.542 <v ->Thank you, everybody.</v>

2466 02:12:50.542 --> 02:12:51.874 Nice- <v ->And let us</v>

2467 02:12:51.874 --> 02:12:53.624 all give an applause.

2468 02:12:54.614 --> 02:12:56.852 <v ->Thank you.</v> <v ->Thank you so much.</v>

2469 02:12:56.852 --> 02:12:59.760 <v Presenter>Thank you. It's been a pleasure.</v>

2470 02:12:59.760 --> 02:13:01.519 Thank you so much. <v ->Thank you.</v>

2471 02:13:01.519 --> 02:13:03.049 <v ->So much, Donna.</v> <v ->Thank you so much.</v>

2472 02:13:03.049 --> 02:13:05.243 <v ->Thank you. Bye bye.</v>

2473 02:13:05.243 --> 02:13:07.052 <v ->Bye.</v> <v ->Thank you.</v>

2474 02:13:07.052 --> 02:13:08.552 <v ->Bye.</v> <v ->Thank you.</v>

2475 02:13:09.981 --> 02:13:11.564 <v ->Bye.</v> <v ->Bye, Donna.</v>

2476 02:13:12.894 --> 02:13:15.826 <v Student>Bye bye, thank you.</v>

2477 02:13:15.826 --> 02:13:18.743 <v ->Thank you, thank you.</v> <v ->Thank you.</v>

2478 02:13:21.231 --> 02:13:24.254 <v Speaker>Thank you, Donna. Thank you again.</v>

2479 02:13:24.254 --> 02:13:25.921 <v Speaker>So much.</v>

2480 02:13:28.356 --> 02:13:30.773 (indistinct)