1
00:00:03,830 --> 00:00:02,149
decades of research and technology have

2
00:00:06,070 --> 00:00:03,840
allowed for better forecasting of the

3
00:00:08,470 --> 00:00:06,080
when where and how intense a hurricane

4
00:00:10,950 --> 00:00:08,480
will be but what if we could predict a

5
00:00:12,789 --> 00:00:10,960
disease outbreak in the wake of a storm

6
00:00:14,789 --> 00:00:12,799
that's the question some researchers

7
00:00:17,510 --> 00:00:14,799
asked about cholera in haiti in the

8
00:00:19,429 --> 00:00:17,520
aftermath of hurricane matthew

9
00:00:21,029 --> 00:00:19,439
cholera is a waterborne infectious

10
00:00:23,189 --> 00:00:21,039
disease that occurs when a person

11
00:00:25,269 --> 00:00:23,199
ingests food or water contaminated with

12
00:00:27,830 --> 00:00:25,279
the vibrio bacterium

13
00:00:30,310 --> 00:00:27,840

cholera causes severe diarrhea nausea

14
00:00:31,990 --> 00:00:30,320
vomiting and dehydration and can lead to

15
00:00:33,910 --> 00:00:32,000
death if untreated

16
00:00:35,750 --> 00:00:33,920
researchers estimate that hundreds of

17
00:00:37,830 --> 00:00:35,760
thousands of cases are reported each

18
00:00:39,430 --> 00:00:37,840
year worldwide

19
00:00:41,830 --> 00:00:39,440
the bacterium is

20
00:00:43,590 --> 00:00:41,840
found in world oceans

21
00:00:45,590 --> 00:00:43,600
globally

22
00:00:47,190 --> 00:00:45,600
especially in the temperate regions and

23
00:00:49,190 --> 00:00:47,200
in the tropics

24
00:00:50,950 --> 00:00:49,200
so in the countries

25
00:00:53,830 --> 00:00:50,960
less developed

26
00:00:55,510 --> 00:00:53,840
with infrastructure that is not the

27
00:00:58,470 --> 00:00:55,520
equivalent let's say

28
00:00:59,430 --> 00:00:58,480
europe or the united states or canada

29
00:01:02,630 --> 00:00:59,440
then

30
00:01:05,030 --> 00:01:02,640
the population that has to rely on

31
00:01:07,350 --> 00:01:05,040
river water pond water

32
00:01:09,830 --> 00:01:07,360
is at risk for cholera

33
00:01:11,590 --> 00:01:09,840
in addition to water insecurity high

34
00:01:13,350 --> 00:01:11,600
seasonal temperatures followed by

35
00:01:15,350 --> 00:01:13,360
extreme rainfall

36
00:01:17,190 --> 00:01:15,360
concentrated populations

37
00:01:19,109 --> 00:01:17,200
and a natural disaster are all

38
00:01:20,469 --> 00:01:19,119

conditions conducive to a cholera

39
00:01:23,670 --> 00:01:20,479
epidemic

40
00:01:25,590 --> 00:01:23,680
this was the case for haiti in 2010 the

41
00:01:27,429 --> 00:01:25,600
data that we were able to to pull

42
00:01:30,550 --> 00:01:27,439
together showed that

43
00:01:33,429 --> 00:01:30,560
in 2010 it was the hottest

44
00:01:34,789 --> 00:01:33,439
summer in 50 years and then as if that

45
00:01:37,350 --> 00:01:34,799
weren't enough

46
00:01:40,310 --> 00:01:37,360
there was a hurricane that skirted the

47
00:01:41,590 --> 00:01:40,320
island but it dumped the heaviest

48
00:01:44,149 --> 00:01:41,600
rainfall

49
00:01:46,389 --> 00:01:44,159
in 50 years we tried to make an

50
00:01:48,630 --> 00:01:46,399
algorithm in a cohesive form to

51
00:01:50,630 --> 00:01:48,640
determine the risk and and that

52
00:01:53,590 --> 00:01:50,640
basically provided us with the first

53
00:01:58,310 --> 00:01:53,600
clues on the risk of outbreak of cholera

54
00:02:04,550 --> 00:02:01,670
then we use the same algorithm

55
00:02:06,789 --> 00:02:04,560
with improved satellite data sets from

56
00:02:09,430 --> 00:02:06,799
global precipitation measurement mission

57
00:02:10,070 --> 00:02:09,440
after hurricane matthew struck that

58
00:02:12,470 --> 00:02:10,080
region again

59
00:02:15,030 --> 00:02:12,480
[Music]

60
00:02:17,350 --> 00:02:15,040
and we were able to in real time predict

61
00:02:19,270 --> 00:02:17,360
the risk of cholera infection in human

62
00:02:21,190 --> 00:02:19,280
population at least four weeks in

63
00:02:23,990 --> 00:02:21,200

advance

64
00:02:25,510 --> 00:02:24,000
we did the same thing for yemen we knew

65
00:02:27,190 --> 00:02:25,520
that there is a mass movement of human

66
00:02:30,150 --> 00:02:27,200
population due to civil unrest in that

67
00:02:32,150 --> 00:02:30,160
part of the world and then we had very

68
00:02:33,990 --> 00:02:32,160
heavy precipitation and then we

69
00:02:36,550 --> 00:02:34,000
immediately started monitoring

70
00:02:40,070 --> 00:02:36,560
conditions and that basically converged

71
00:02:41,830 --> 00:02:40,080
to give us a risk on where and when this

72
00:02:43,110 --> 00:02:41,840
this disease will occur in human

73
00:02:46,229 --> 00:02:43,120
population

74
00:02:48,390 --> 00:02:46,239
i think we can predict and prevent

75
00:02:50,869 --> 00:02:48,400
and i'd like to see that happen very

76
00:02:53,750 --> 00:02:50,879
quickly in the next three to five years

77
00:02:56,869 --> 00:02:53,760
and i'd like to see the satellite system

78
00:02:59,110 --> 00:02:56,879
to be part of the regular public health

79
00:03:00,470 --> 00:02:59,120
tools so that we can do

80
00:03:03,430 --> 00:03:00,480
prediction