STANDARD DEVIATIONS: Reality Check

Riiiight,

Here's a quote from the study PI (Principle Investigator) **in 2015** re the newly developed Ebola vaccine (Zaire strain): "This new vaccine, if the results hold up, may be the silver bullet against Ebola, helping to bring the current outbreak to zero and to control future outbreaks of this kind."

"A vaccine against Ebola has been shown to be 100% successful in trials conducted during the outbreak in Guinea and is likely to bring the west African epidemic to an end, experts say." This was the lead in the news story. That was 2015. The study involved 4000 participants.

In the last month, new data touts a 97% success rate for the vaccine in its current usage in the DRC. Over 115,000 doses have been administered. The Merck promise is to provide 300,000 and have that many stockpiled, if needed. Okay, so they're off by 3%; no big deal, right?

Well, numbers are just numbers.

In 2000, we declared the U.S. free of Measles (yay for vaccines!) and here we are in an outbreak nobody thought would happen. From January 1 to May 3, 2019, 764 individual cases of measles have been confirmed in 23 states. This is the greatest number of cases reported in the U.S. since 1994 and since measles was declared eliminated in 2000. So much for vaccines?

I suggest that vaccines are a great tool in our kit. But just like our gloves, safety cabinets, protective eyewear, lab coats and common sense, vaccines are only a barrier; not a solution.

We have to consider the fact that **contact** is the real issue. Let's think about this. Health care workers represent 7% of the Ebola cases in the DRC outbreak (in today's numbers that would be around 100). ALL of them were vaccinated! This outbreak was managed from the get-go with vaccine use for all responders. If that 100 is 3% then there are over 3000 HCW in the field (sounds about right, to me). If 115,000 Congolese have been dosed, then we can expect ~400 vaccinated individuals to also get disease (and 3% of all new vaccinations).

Again, these are just numbers; **they all have to have contact** with the virus; or, I suggest, **none of them get Ebola.**

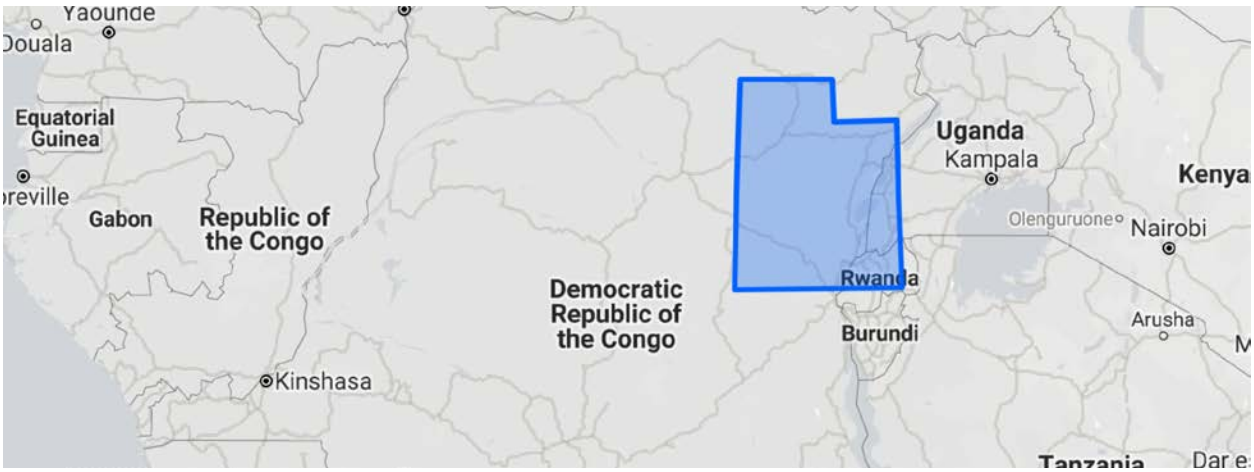
This is the way we need to think about safety; the best way to avoid contracting a disease is to avoid contact. Yes, vaccines are great (not the point); elimination of contact is better.

In the lab, every sample that comes to the bench is an unknown. That's what we do; we figure out what's in the blood, urine, CSF, sputum, wound scraping, tissue or whatever we're given. We utilize practices, precautions, PPE, N95, Biosafety Cabinets, handwashing, and vaccines to manage the risk of contact with organisms that pose risk to our health. Effective safety practices

keep us pretty safe and **we're lucky** to live and work without exposure to many dangerous pathogens.

What if that were not the case?

Here is Utah in relation to the DRC area of the current Ebola outbreak.



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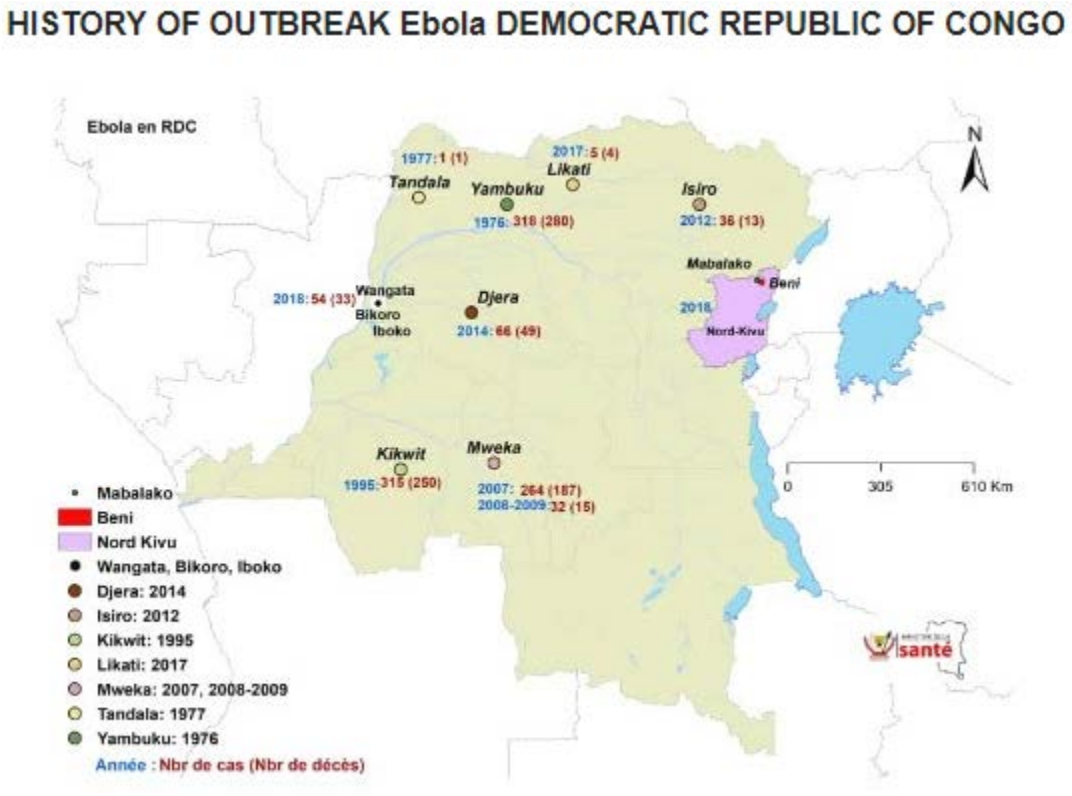

The relationship in area is pretty striking. There are over 50,000 health care employees in Utah. Intermountain has nearly 40,000 alone. Well, I'm not a math whiz but my calculator says that 3% of 50,000 (or so) is 1500 (just health care!) who would be Ebola patients or statistics right now, if that virus were endemic here.

No vaccine, PPE, or BSC will ever give us 100% protection. The ideal is not reality. All the safety practices we throw at our work will never eliminate the risk **because we are tasked with testing unknowns, and because we are humans**. What we can do is make sure we do throw everything and use our understanding of risk and best practices to avoid contact with pathogens.

So, here's my sermon, today. Recognizing the importance and impact of biosafety has real value. Best practices in our efforts are critical to maintaining the safety of testing personnel. Vaccines are a component of the larger toolkit we have to reduce risk. Biosafety requires training and competency among staff. We can't control what pathogens we encounter on the bench, but we can mitigate and influence our proximity to those pathogens. Numbers are just numbers; biosafety keeps us from being a statistic.

Have a great week and be safe,

Bryan

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