

MicroChat: Elements of critical thinking

Prevention is better than cure

(Kenneth Timmis)



Jess is the boy in the centre of the image, Kate is on the right, being given a sloppy kiss by Scamp the family dog, and Ximena (Cindy-Lou) is in the front.

(created by Fran Jebok; <https://www.theabsurdmicrobe.com/recurring-characters/>)

Kate, walking-running along the path pulled by Scamp: Hello Farmer Giles! How are you this beautiful morning?

Farmer Giles: Hello Kate! Yes, the weather is gorgeous and promises to stay like this for a few more days, so I shall be able to harvest my wheat crop this week. I see that *Scamp* is full of energy. What do you have in that bag?

Kate: Oh, Mum made a lot of bread at the weekend and we have some left over, so I am going to the village pond to feed the ducks with it.

Farmer Giles: Hmmm – are you sure that is a good idea? The natural diet of ducks consists of aquatic plants and small animals which are rich in the nutrients ducks need for a healthy life. Ducks certainly like bread, as we do, but it is not very nutritious for them and can give them health problems like *angel wing*.

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Kate: Oh: poor ducks - I would not like to cause that! But they do seem to enjoy a bit of mum's bread....

Farmer Giles: I know: it is really good and I also enjoy it when your mum gives me some. But bread is only a small part of our diet and we obtain the things we need through vegetables, fruit and sometimes meat. Best let the duck forage naturally for their food so that they have the best nutrition and stay healthy. *Prevention is better than cure!*

Kate: Oh: mum often says that too! We will take *Scamp* to the vet's next week for his catch-up vaccines to prevent him getting some doggy infections.

Farmer Giles: Excellent - *Scamp* is obviously very fit and super lucky to have such a caring family! Vaccinations are so important: all my sheep and pigs are healthy because they have been vaccinated....and you are too!

Kate: Yes, but I hate having those needles stuck in my arm!

Farmer Giles: I know, it can sometimes hurt a little bit. But imagine: if you don't have a 'flu vaccine, you have a high chance of getting the 'flu, with all the discomfort of high temperatures, sore throat, coughs and the sore chest they cause, and all the other unpleasant symptoms you experience over days. Not to mention the fact that you can't play with your friends for at least a week! So a little prick of the arm is a tiny price to pay to avoid all this – prevention is always better than cure!

Kate: Well, I suppose so! *Farmer Giles:* I want to ask you a question about a school friend, Maisy. She is a new girl who joined our class at the beginning of the year. She is nice and we got along very well at first but now she has become friends with some girls of another group, so we no longer play together. Why do you think she does not want to be with me?

Farmer Giles: Hmm: I cannot imagine why anyone would not want to be your friend. Did you invite her to your birthday party and any of the activities you had with your friends?

Kate: Well...no....because we are a group of swimmers and she does not swim much.

Farmer Giles: Ahhh - that may be the reason. If a friendship is important, you really need to invest in it to keep it. strong. If you want to be friends with Maisy, you must try to spend time with her, also doing things she enjoys. Investing in a relationship will often prevent it from deteriorating.

Kate: So what do you think I should do?

Farmer Giles: Good question! Why not ask your mum if you can invite Maisy for afternoon tea and cakes one day: that is an invitation no-one can refuse! And, during the tea, you can find out what Maisy likes to do and plan to do some things together that you both enjoy.

Kate: Oooh, that is a super idea!

Farmer Giles: Yes: *prevention is better than cure* is an important rule of life. Farmers live by it. For example, that wheat field over there is super productive and gives me the best yields. The one at

the bottom of the hill is quite a bit less productive. However, I do not plant wheat in the best field every year but rotate the cropping, say one year with canola and another with carrots, so one year I will have top yield, the next not such a good yield, and the next also not such a good yield.

One important reason is that plants, like you, me and *Scamp*, are susceptible to infections. However, we cannot vaccinate plants against infections (at least not yet) so we lose some every year. The thing is: if we grow the same type of plants in the same field every year, the pathogens accumulate in the soil so that infections increase each year and crop yields decrease dramatically. However, pathogens tend to die off in soil from one year to the next. Since different plants are infected by different pathogens, if we grow different plants each year, pathogens do not accumulate in soil. So: although crop rotation may not give the highest yields every year, it prevents major losses.

Kate: We learned about crop rotation in school, and also about a fallow field in which no crop is planted. Do you also do this?

Farmer Giles: Certainly! From time to time, I will give a field a rest and not plant anything in it for a whole year, so wild plants can grow on it. This not only improves the soil but also provides wild flowers for the bees and other insects to feed on. And sometimes I will even produce a crop just for the soil: this is called a green manure – a plant that specifically improves soil health.

Kate: Gosh: I always imagined that soil is soil, plants just grow in it and farming is about taking care of the plants!

Farmer Giles: Yes: that is the way most folk think. But soil can be healthy or unhealthy and when it is unhealthy, plants do not grow well, which is why farmers spend a lot of time, energy and well-earned money trying to keep it healthy. And this means taking care of the microbes.

Kate: Oh, I did not know that! Why are microbes important for soil health?

Farmer Giles: Do you remember our last chat: it was about what you learned in school about the human microbiome, and especially about the gut microbiota?

Kate: Of course: that was just fascinating, one of my favourite lessons! We learned that the gut microbiota is an amazing chemical factory producing all kinds of chemicals, some of which help us stay healthy and others of which put us in a good mood.

Farmer Giles: Exactly! And do you remember that a healthy gut microbiota is very diverse with lots of different species of microbes? And that, to maintain this diversity, it is essential to eat lots of different vegetables and fruits because, when we feed ourselves, we also feed our microbes and different foods feed different microbes?

Kate: Definitely! In fact, I read somewhere that we should eat things from 30 different plants a week, though I don't know how mum manages that!

Farmer Giles: So: just think of soil as the gut of the biosphere, a global chemical factory with the microbial chemists creating all manner of chemicals that keep the biosphere healthy. But to do

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this job, they need to be fed with a wide diversity of foods. Plants feed the microbes by making food through photosynthesis. Some of this food is released directly into the soil by transporting it from the leaves to the roots, which then leak it into the soil. And some is introduced when the plant dies and rots in the soil. The job of the farmer is to make sure that the soil microbiome is kept healthy by growing diverse plants on the fields and adding back plant diverse materials, so that it is fed properly and in turn keeps the soil healthy. In fact, a lot of what farmers do is to maximise soil health and minimise soil pathogens so that we can obtain good yields of crops that feed the world. Our mantra is *prevention is better than cure*.

Kate: Well Farmer Giles: I think that should be everyone's mantra! I will definitely not complain any more about a silly little prick in my arm when the nurse gives me a vaccine! Preventing an infection is definitely better than suffering from it! If mum agrees to my inviting Maisy for tea, would you also like to come? You could chat with mum while Maisy and I are having girly talk and plotting against the boys in our class.