

## **Bow Tie for Covid-19 (as per CCPS/EI guidance)**

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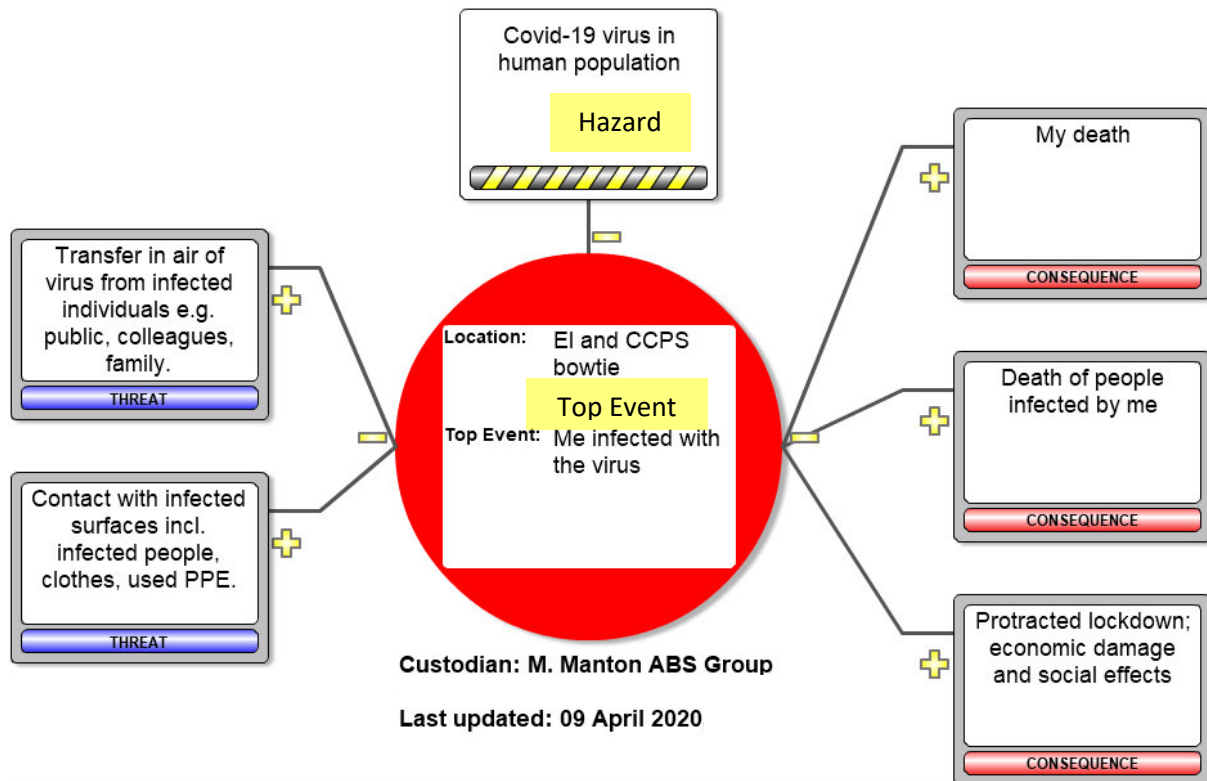
Covid-19 is sweeping the globe and there is a lot of guidance on what we should be doing, but this tends to be many words and it is not always obvious why specific guidance has been introduced and what it hopes to achieve. So we have produced a picture which hopefully explains **your** role in the whole pandemic, a visual aid in the shape of a bowtie:

*The bow tie methodology illustrates how threats can act on hazards leading to a loss of control, which may result in catastrophic consequences. In the bow tie diagram, prevention barriers are located on the left side and mitigation barriers are located on the right side. A well-drawn bow tie clearly shows all barriers that can prevent the top event, the loss of control, from occurring or mitigate the consequences.*

We, members of the committee who worked on the recent book, “Bow Ties in Risk Management”, published by the [Energy Institute](#) and the American Institute of Chemical Engineers’ [Center for Chemical Process Safety](#), developed this bowtie for Covid-19.

**We welcome all comments to help us improve it to make it more useful for all.**

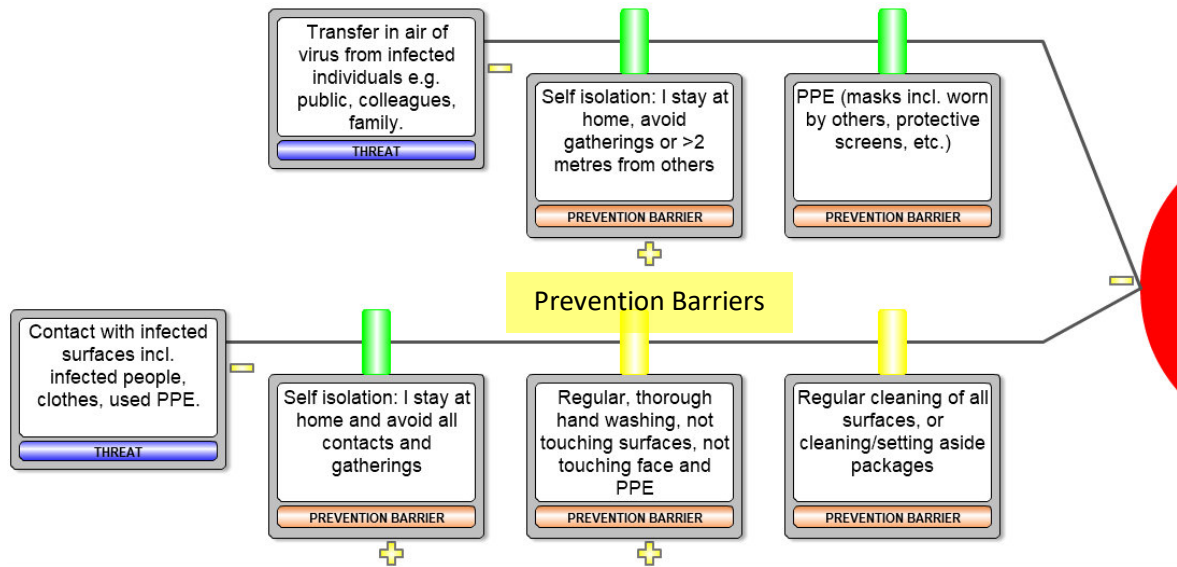
**Please note: this bow tie is based primarily upon the directives and guidance from the [UK Government](#) and the [CDC](#). In all cases you should follow the directives and guidance from your own government and health institutions around the world. The knowledge and understanding of Covid-19 is increasing and the most recent directives and guidance should always be followed. We will update and edit this bowtie as new guidance becomes available.**



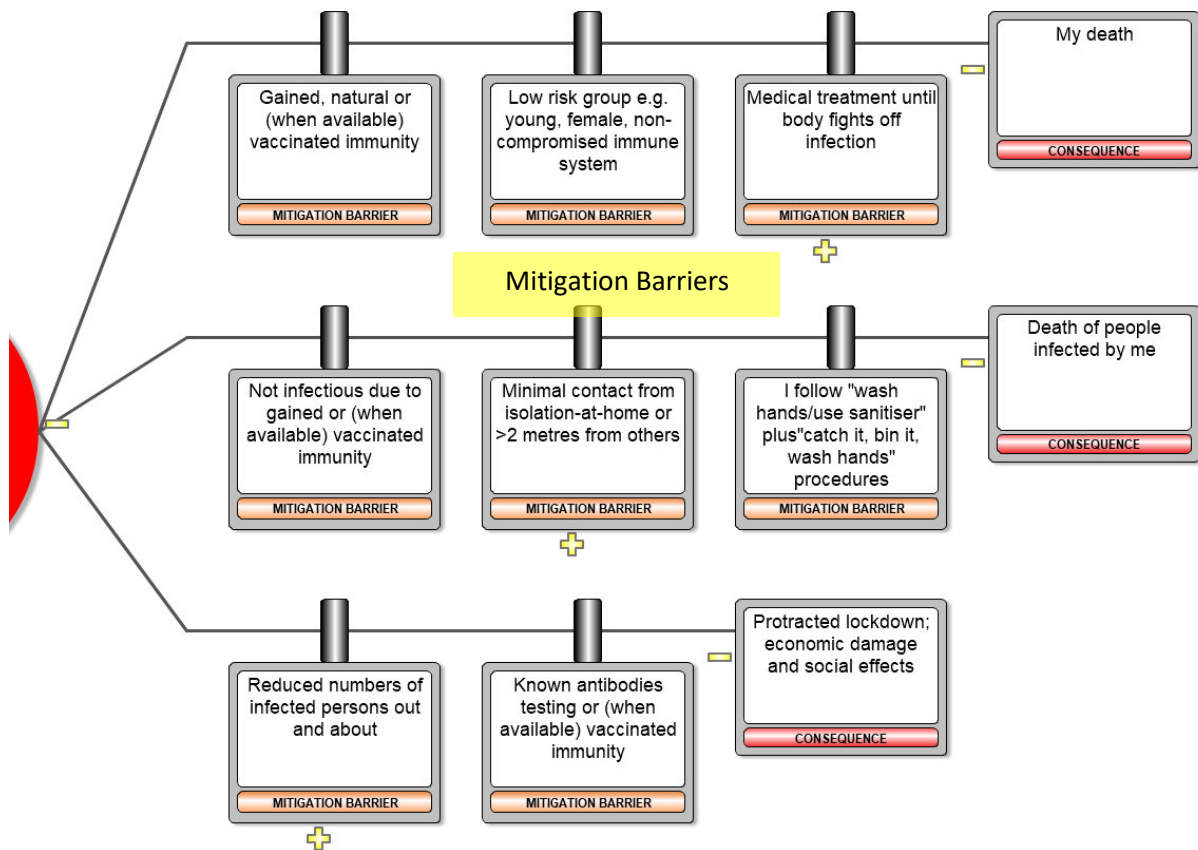
- There are only 2 threats leading you to catching Covid-19: via airborne transfer of the virus, or from direct contact with infected surfaces and then touching your face and infection via eyes, mouth or nose.
- There are only 3 possible serious consequences:
  - your death or
  - the death of someone you infect
  - a protracted lockdown with associated economic consequences

And the **Top Event**, when things start to go wrong, is when you become infected.

To stop this happening we have **prevention barriers**:



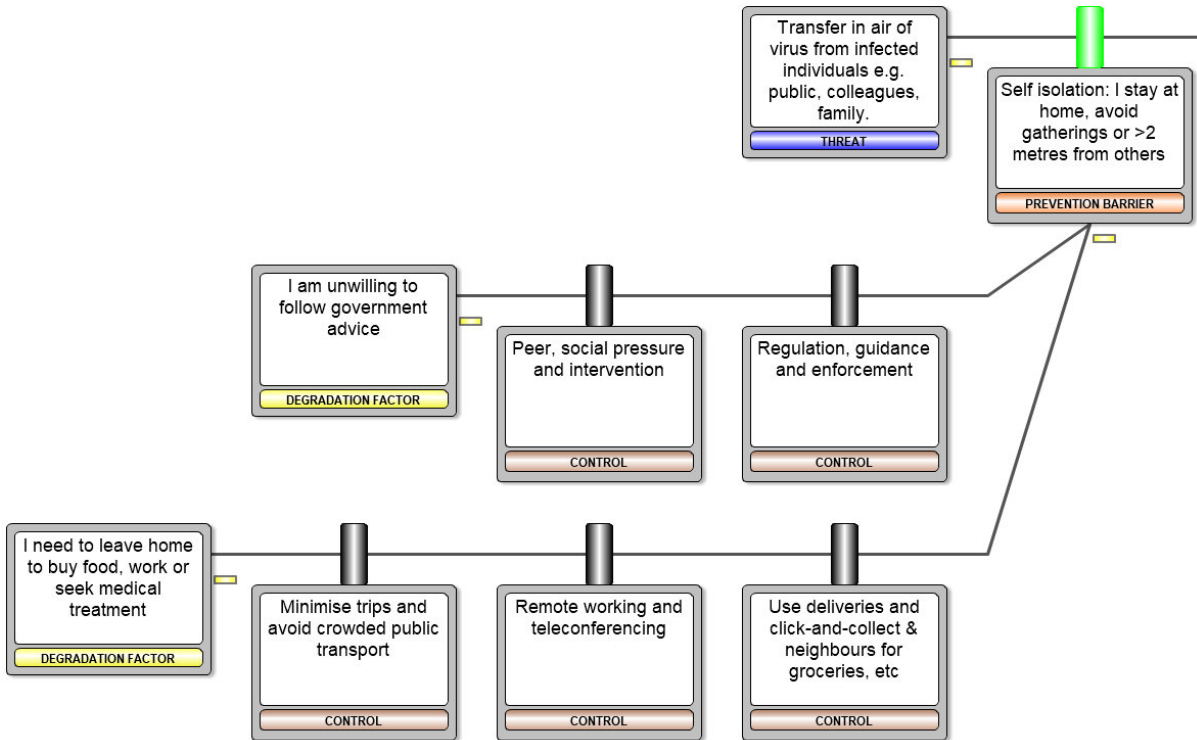
And once you are infected, we have **mitigation barriers** to try and prevent your death, you infecting others or a protracted lockdown:



## But Barriers Degrade

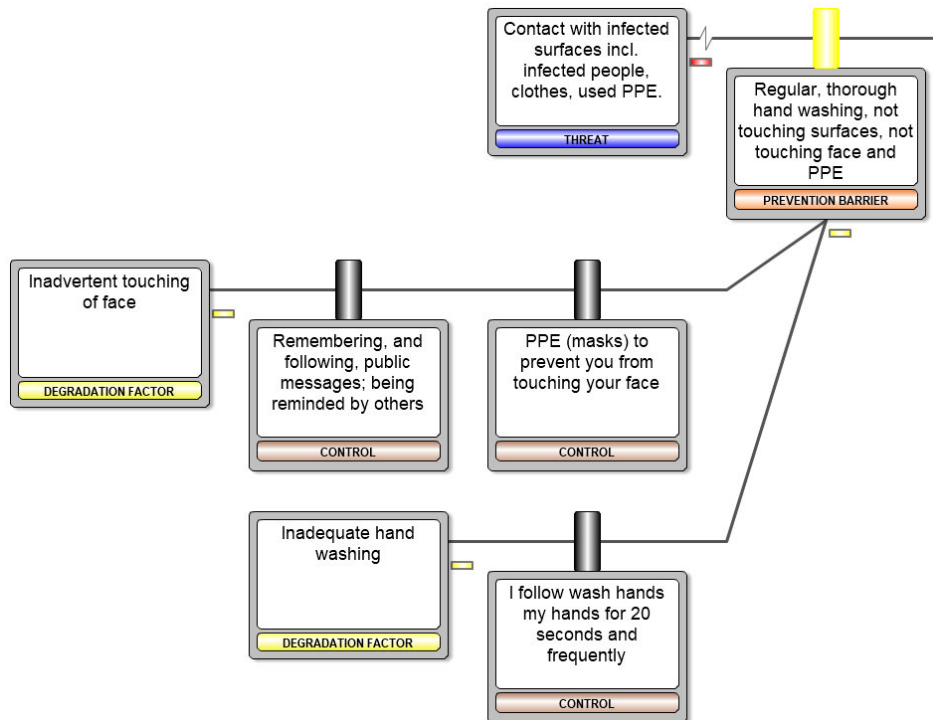
100% perfect physical separation will stop all infections, but things degrade this perfection, so we have government guidance (or “**controls**”) to try and minimise the holes developing in the barriers. If the controls work perfectly then the barrier will continue to work.

So the **Self Isolation** barrier, which physically separates me from infected people can fail due to two main degradation factors:

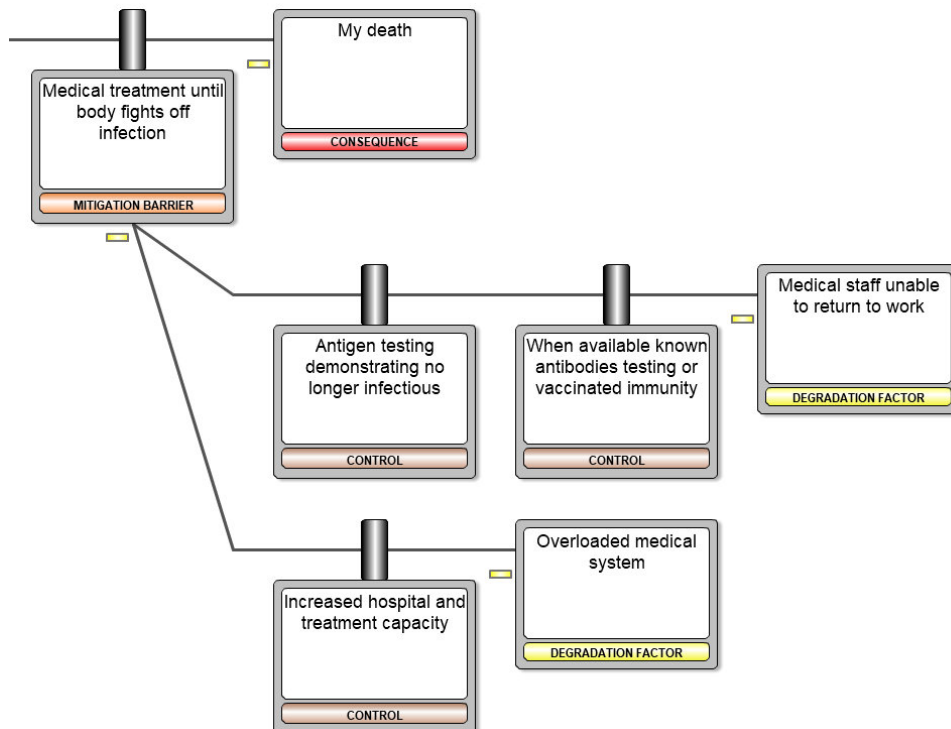


PPE (masks and screens), the next barrier is an effective barrier but can degrade due to unavailability, people not knowing how to use them, etc. but this would probably need its own bow tie.

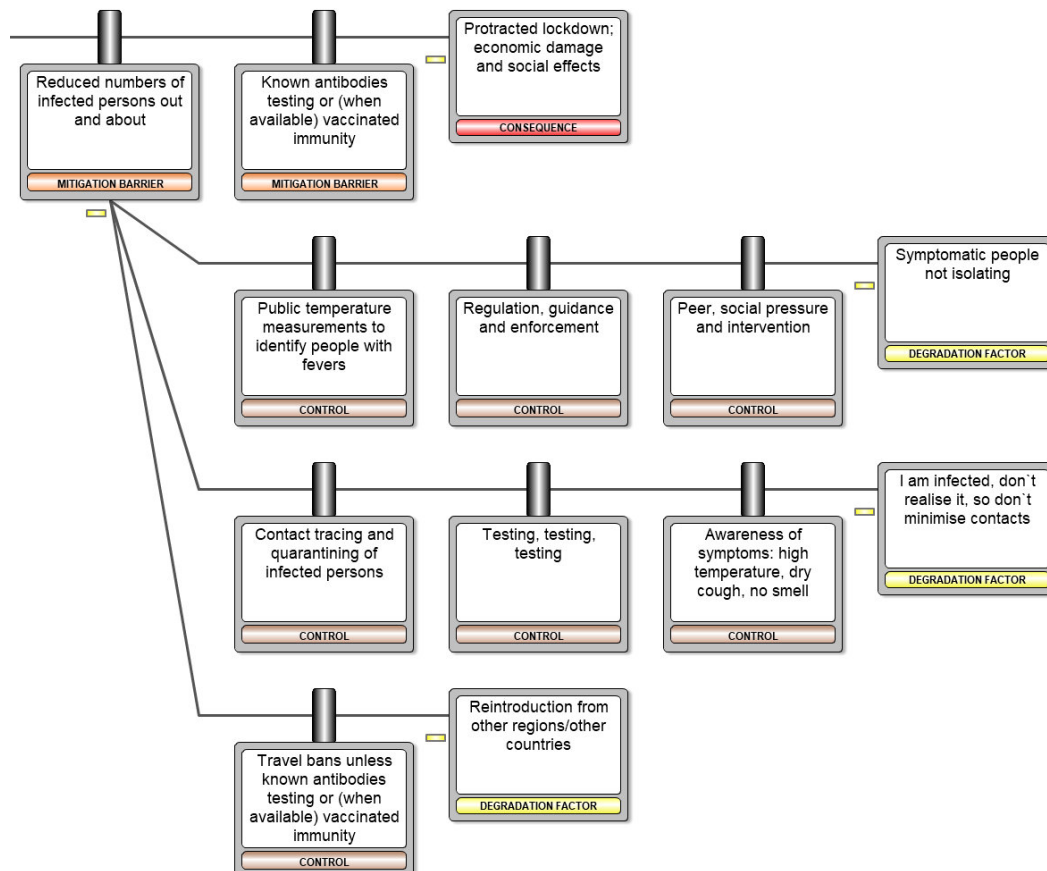
And we aren't all perfect at not touching surfaces and our own faces, so the controls are:



For mitigation barriers, the medical treatment barrier is affected by a number of degradation factors including medical staff not being able to return to work after being infected with Covid-19, this needs the control of the tests for antibodies:



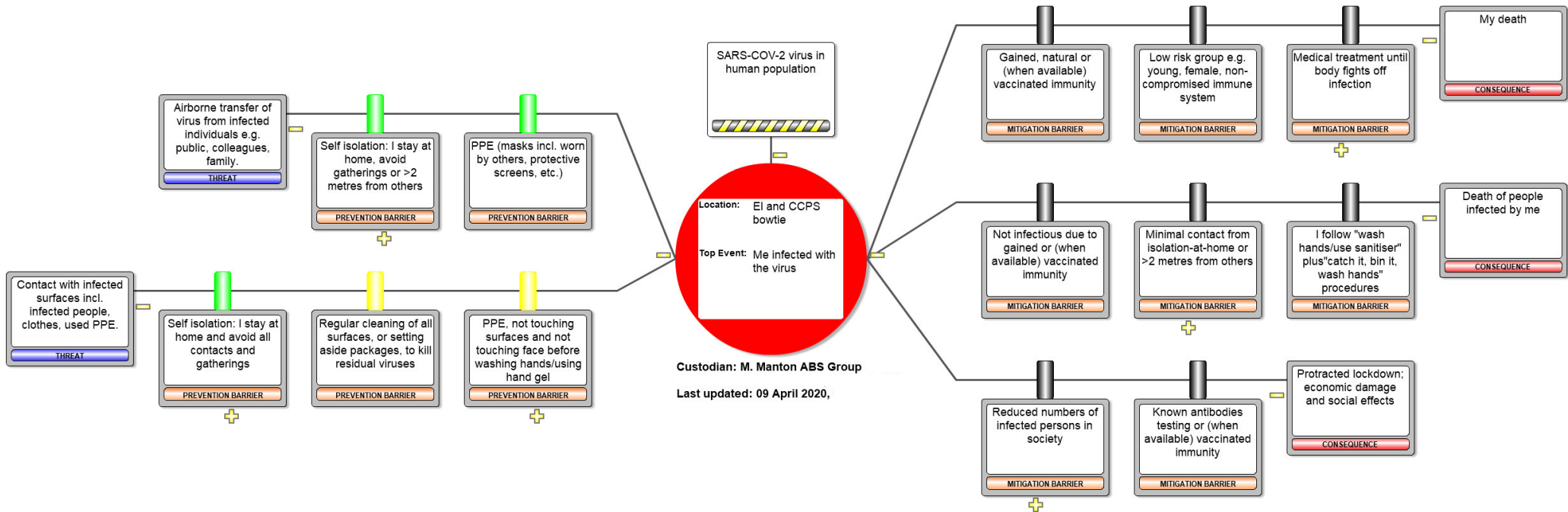
And for the extended lockdown consequence:



### Questions then for you

1. Do **you** now understand that there are only 3 barriers preventing you from catching Covid-19?
2. Do you understand **your** role and that it is YOUR responsibility to YOURSELF and others to prevent this happening by following the government guidance (the “controls” to prevent the degradation factors stopping the barrier working)?  
<https://www.nhs.uk/conditions/coronavirus-covid-19/> and  
<https://www.cdc.gov/coronavirus/2019-ncov/index.html>
3. And if you catch it there are three possible consequences: your own death, you infecting others, possibly leading to their deaths and the lock-down continuing even longer. We don't want any of them.

Finally here is the complete bowtie with all the barriers shown:

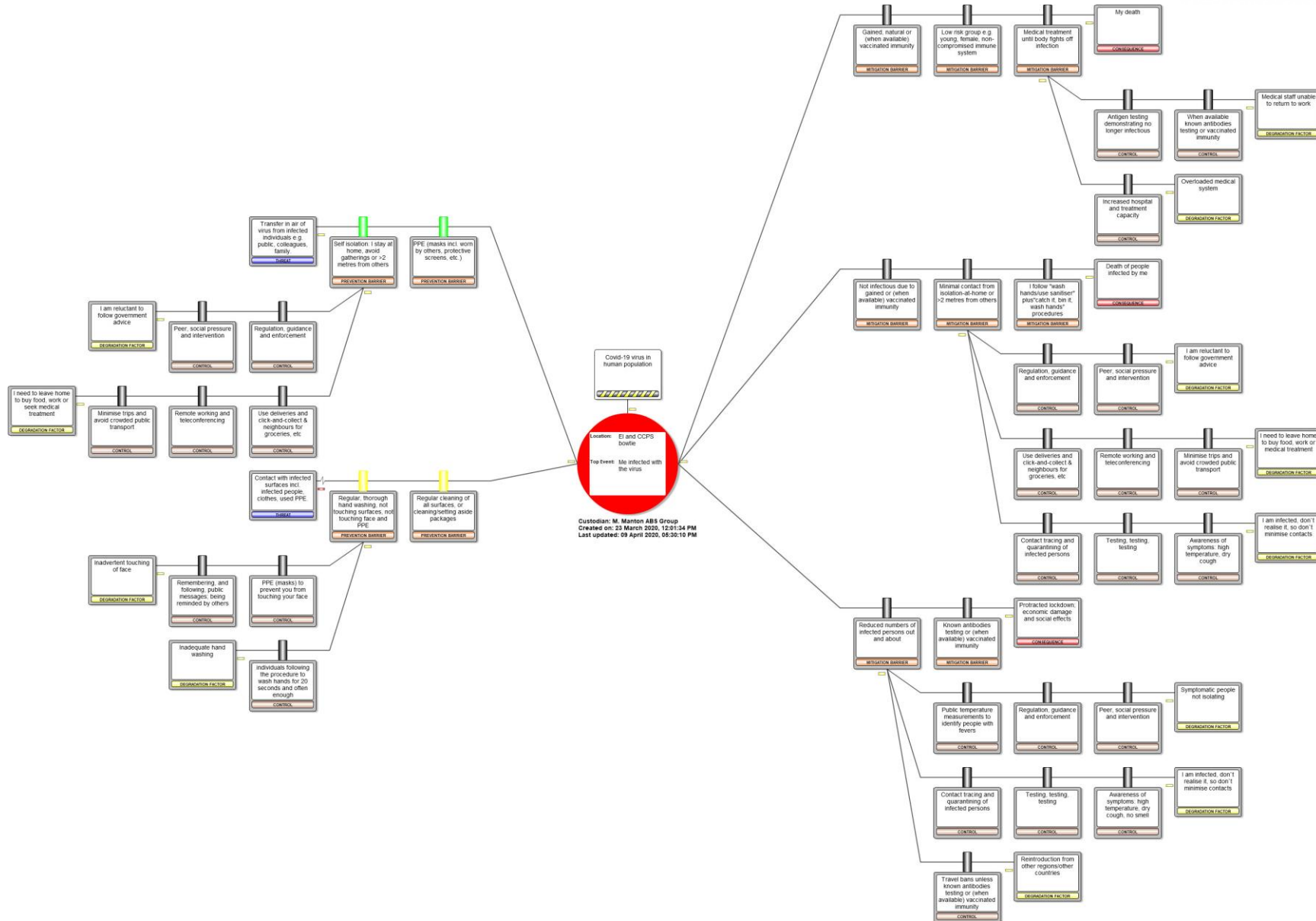


If you would like to observe the bowtie in more detail, then please contact Mark Manton ([mmanton@ABS-Group.com](mailto:mmanton@ABS-Group.com)) and he will happily send you a portable bowtie (to be read via a simple, free bowtie reader). Alternatively, if you have THESIS then we can provide the file. If you don't have THESIS file then please contact [thesis@absconsulting.com](mailto:thesis@absconsulting.com) for a trial version. Alternatively, the complete bowtie is shown on the next page, but this requires a lot of zoom in order to be able to read the texts (or printing on large format paper!)

Please note: the disease COVID-19 is caused by the SARS-COV-2 virus. We have used "Covid-19" interchangeably here for simplicity.

9<sup>th</sup> April 2020







## Main changes since 31<sup>st</sup> March version

### Rewording of a number of barriers to avoid misinterpretation

- Airborne transfer threat changed to “transfer in air”.
  - “Not touching face” barrier removed (only applies to virus on surfaces)
- Contact with surfaces threat:
  - Addition of self-isolation barrier
  - Combination of PPE with hand washing/not touching face (the same individual is involved in them so they were not independent)
- My death consequence:
  - medical treatment barrier: additional degradation factor of “overloaded medical system”
- Protracted Lockdown consequence
  - Addition of “reduced numbers of people out and about” barrier, with associated degradation factors

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