Covid 19
Can we continue living our lives with the virus among us?

What we know, what we don´t know, what to expect, how to act

Introduction

- **Should we give in to our fear or should we embrace the risk and live with the virus ?**
  - The world has been confronted with an unknown fear. Starting in China and spreading over the world forcing countries to close down and stopping economies and the essence of life itself.
  - Governments stepped in, in each there own way, in stopping this invisible enemy. Even Kings and Queens assisted the Governments in making people believe that we were at war with this invisible enemy and that it was allowed to mingle with our rights of freedom. (Stay at home!)
  - And we all agreed on this! Leaders of there countries got more popular then ever and experts started taking over and a new words got introduced. Front liners & Social Distancing and ´Flatten the curve´
- **Are we still at war with an invisible enemy ?**
- **Or do we know the enemy by now and are we now facing something else?**
- While the virus goes on for a while in most countries letting people in shock, governments are creating new ways to incorporate this virus. It is clear that this virus has made it´s statement. It is here to stay. The question is:
  - Should we make new rules in dealing with this virus while giving in into the fear with this unknown virus or
  - Are we making decisions to return back to the life as we know it based on facts, knowing what we know, by embracing the fear.
- **It looks like Governments are choosing the first option and here lies a risk! This presentation will show why.**
- We all understand that we need to get back to business but how. Experts and also Governments showed a lot of leadership and power by closing down their countries and borders, but show signs of a child that doesn´t know how to swim when it comes down to starting up again. And it seems that we are all waiting for one another.
- The presentation gives insight in where we stand now and what we could do to return back to our ´normal´ life and tries to answer the questions in how to move on. In the presentation we give a direction on a possible solution based on the available data worldwide, but specific for the Netherlands. This approach is universal and could also be used for other countries but it needs to be mentioned that specific data for that country might be needed.
- The models are used to make a point. The models are not scientifically proven and nor should they be seen as the absolute truth. However the results are probably closer to reality than currently reported. The data that is collected comes from reliable sources.

Covid 19 (what we know in General)

- Virus from 2019, originated in Wuhan China
- No cure so far, vaccine will take at least 2 years! (18 months = a miracle)
- More than 3 million infected, more than 200 thousand died
- The R0, the reproduction number of this virus has a range between 2-2.5
- The average time between each successive infection : 4 to 4.5 days.
- Started in China, then Europe, UK and US
- Centre of pandemic is now US
- 1/3 of the world in some form of lock down, first one on Jan 23rd (Wuhan)
- Many data is available on (worldometers, RKI, RIVM etc.)
- Data is so far not very accurate (biased but getting better and better)

Where do we stand now between countries ?

Most of the countries are in sort of a lock down however:

- All countries addressed the situation differently and sequentially (not the same time)
- All countries underestimated the virus and continued as ´business as usual´ to keep the economy going.
- Italy, Spain & France seemed to have acted too late when the virus hit.
  - Hospitals couldn't handle the amount of patients, Many died because of the lack of space in the hospital, lack of equipment and lack of protection
  - Many that died are older persons, probably with pre existing conditions
- Sweden did not close down at all (however it seems to work)
  - They did some sort of social distancing, early closure of big events, elderly are very self-aware of the risks and stay at home, no issue with capacity in hospitals
  - The mortality rate seems higher but the country doesn´t panic and life moves on. Amount of casualties is comparable with the Netherlands
  - 30% of Stockholm is already infected and the ratio of 60% of herd immunity will be reached fast!
- Belgium seems not to panic even if the numbers seem relatively high!
- Portugal closed relatively early! Around the first death Portugal was already in state of Emergency (March 18th) & soon after closed the borders with Spain!
- US was going fast in the beginning (New York almost 50%) but seems to stabilize. Did they reached its highest point?
  - Mortality rates are similar to Europe while acting later!
  - Does that mean that measure taking by Governments are overrated?

Where do we stand now within countries?

- **Some countries are more hit than others**
  - France Italy and Spain are most hit in Europe!
  - In the US it is mainly New York (near 50% of the casualties)
  - In the Netherlands, Germany it is mainly the South part that is it the most infected
- **It looks like looking worldwide that the virus did no spread evenly**
- **Even within countries the spread is different:**
  - Italy has Bergamo, Spain Madrid, US, New York, France(area Paris)
  - Even in Portugal, Germany, Netherlands you see it
- **Why does the virus not spread evenly?**
  - Could it be we have super spreaders, could it be the spread came through big events, could it be that the virus spreads more easily in smaller places and larger cities where the population is more dense and were places are more moistery, could the weather has an influence?
  - Or is it simply time that is needed to let the virus go away!

Answers that we can analyse since the virus is now there since December 2019 and many data is now collected!

Where do we stand now concerning correct data

- **Are we using our data in a correct way?**
  - What do we really know about the rate of infection at this point?
  - Do we really need to create herd immunity? Or was it just an idea
  - Is it 100% sure that we al can get infected or is that not the case?
  - Who is more infected and can we protect them?
  - What do the numbers say if you test in an environment that is already in lock down?
  - Can we compare the numbers between countries if they are biased (Russia, China seem to underreport, India doesn´t test, Germany, Portugal are testing a lot, Italy is testing a lot but started after the lock down)
- **One thing is for sure. Not all data can be used for analysis.**
  - Data in some countries seem to be political moved
  - Data for the number of casualties are not counted the same
  - Data is not complete and sometimes incorrect
- **Adding this all together: Can we use the data and make the analyses and what is then True and what is False? Or what data is reliable enough and what is not?**

Where do we stand now financially?

At this moments economies are slowing down!

- **Big companies:** Employees work more from home but is it enough?
- **Restaurants bars are closed** infecting most of the local businesses
  - In the Netherlands the estimation is that with the current policy that 70% will disappear or if we wait longer 0% will survive!
- **Production of wine, beer, coca cola, oil, meat, grain etc.. is dropping fast!**
  - Demand 30% lower that supply.
  - We think mentally that the demand is lower because we can´t deliver. Is that the case? Does demand come up if we return to normal?
  - Oil dropped massively. In US even negative prices, Major stocks are left!
- All the **movement within countries, within Europe, within the world came to a stop (or heavy slow down!)**
  - Many airlines stopped, National airlines are saved by Governments, Most of the fleets are on the ground
  - Boeing, Airbus will have to stop or lower the production etc..
  - In general trade is slowed down, leading to less need to produce!
- **Unemployment rate is increasing**
  - Now there is support from Government's to some extend. Not all countries give the same support. Most are line of credits, support in salary but not 100%, Lay-off situations, delaying taxes, delaying rents etc..

We need to act! What is the right approach!?

We need an exit strategy! But which way to go?

- **Should we focus on herd immunity? This was one of the first ideas of Governments!**
  - Although It is not clear yet if herd immunity will be effective but it doesn´t hurt to start with it.
  - It is still not 100% proven it creates immunity but experts believe it will at least make sure the cells in your body recognize the virus and act. So you can still become ill but less!
  - The faster we reach herd immunity the faster we can let go of strict measurements!
- **Should we keep our social distancing by creating new rules?**
  - Social distancing is there for one purpose only. Protect the healthcare system from collapsing
  - Creating boundaries and a whole new way of life. The 1.5 m society.
    This will result in a fundamental change in how we experience freedom. Is that what we want?
  - Or… Embrace the fear and deal with it in a more analytic approach.
- **What danger are we facing if we wait too long or make the rules too strict?**
  - People will losen up and a second wave will hit us where the impact will be much much bigger!
  - Economies will collapse (The 1929 Great Depression started similar)
  - We are not creating immunity
  - Other countries like China will take a major position in the geopolitics

So…….

Let´s embrace the fear by starting analysing the data!

Covid 19 (What we know so far in general)

- We know that more and more testing is done. Every country is increasing it´s capacity
- Majority that dies has an underlying condition
  - Diabetes, Lung Disease, Cancer, Immunodeficiency, Heart Disease, Hypertension, Asthma, Kidney Disease, and GI/Liver Disease and Obesity
- Age makes a difference (older people are more likely to die once infected)
  - Make no mistake. The chance for elderly people once infected are similar to Russian roulette!
  - Infected people with an underlying pre condition are in serious trouble and die!
- Social distancing seems to work but Sweden shows seemingly a different result. (they do a semi- social distancing)
- The sooner you tackle it the less casualties!
- It has a heavy weight in the health care systems
- Flatten the curve helps lowering the pressure on hospitals
- Closing borders, closing big events, closing restaurants, hotels & Bars helps lowering the effective R, not the R0: be aware of this metric!

R and Ro (numbers that we have seen around)

Basic reproduction number (R0)

The basic reproduction number (R0) measures the transmission of a disease. It is presented as the average number of secondary infections produced by a typical case of an infection in a population where everyone is susceptible. So a R0 for Corona in a population is 2.5, then we would expect each new case of Corona to produce 2.5 new secondary cases (assuming everyone around the case was susceptible). R0 excludes new cases produced by the secondary cases. The basic reproductive number is affected by several factors:

- The rate of contacts in the host population
- The probability of infection being transmitted during contact
- The duration of infectiousness.

For an epidemic/pandemic to occur in a susceptible population R0 must be >1, so the number of cases is increasing. In many circumstances not all contacts will be susceptible to infection. This is measured by the effective reproductive rate (R)

Effective reproductive number (R)

- A population will not be totally susceptible to an infection in the real world.
- Some contacts will be immune, for example due to prior infection which has conferred life-long immunity, or as a result of previous immunisation. Therefore, not all contacts will become infected and the average number of secondary cases per infectious case will be lower than the basic reproduction number.
- The effective reproductive number (R) is the average number of secondary cases per infectious case in a population made up of both susceptible and non-susceptible hosts. If R>1, the number of cases will increase, such as at the start of an epidemic. Where R=1, the disease is endemic, and where R<1 there will be a decline in the number of cases.
- The effective reproduction number can be estimated by the product of the basic reproductive number and the fraction of the host population that is susceptible (x). So: R = R0 times a value x
- For example, if R0 for Corona is 2.5 in a population where half of the population is immune, the effective reproductive number is 2.5 x 0.5 = 1.25. Under these circumstances, a single case of Corona would produce an average of 1.25 new secondary cases.

To successfully eliminate a disease from a population, R needs to be less than 1 in combination with zero growth!

Herd Immunity (how does it work?)

- Herd immunity occurs when a significant proportion of the population (or the herd) have been vaccinated (or are immune by some other mechanism), resulting in protection for susceptible (e.g. unvaccinated) individuals.
- The larger the number of people who are immune in a population, the lower the likelihood that a susceptible person will come into contact with the infection. It is more difficult for diseases to spread between individuals if large numbers are already immune as the chain of infection is broken.
- The herd immunity threshold is the proportion of a population that need to be immune in order for an infectious disease to become stable in that community. If this is reached, for example through immunisation, then each case leads to a single new case (R=1) and the infection will become stable within the population.
- If the threshold for herd immunity is surpassed, then R<1 and the number of cases of infection decreases. For Covid-19 this means R0 = 2.5 so threshold HIT : 1-1/2.5 = 60%
- So if the R0 is correct and the population has reached immunity higher 60% then the R< 1 and the virus will disappear in time!

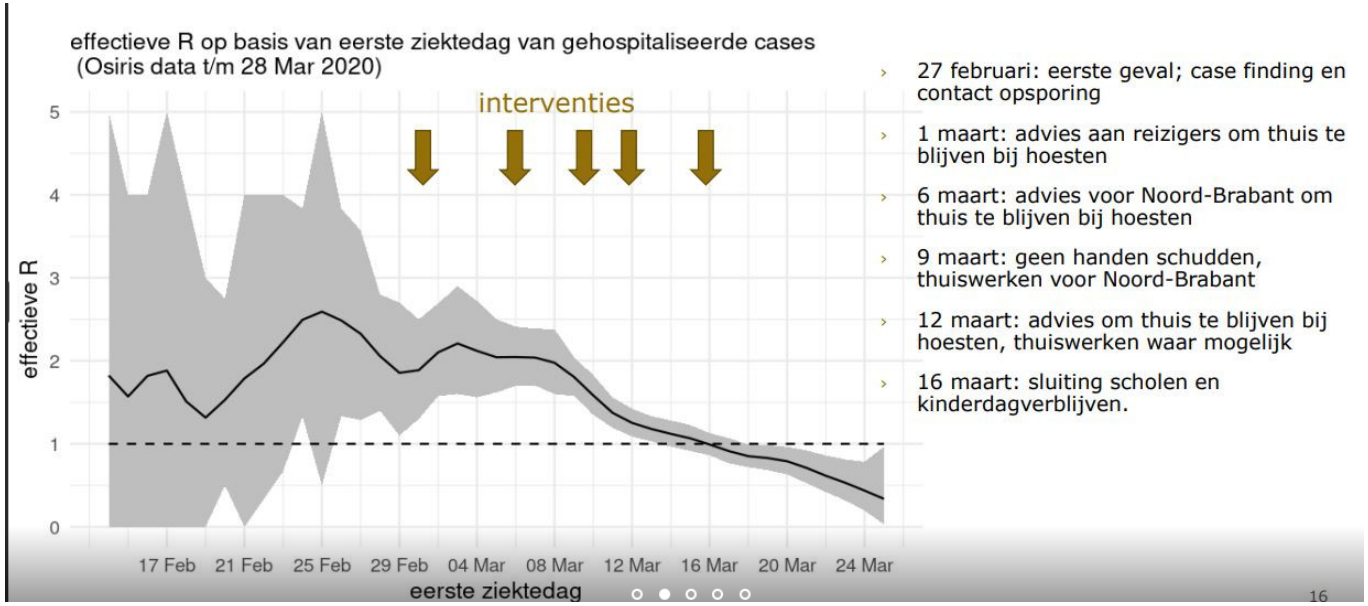
R0 in more detail

- R0 is messier than it might look.
  - Built on hard science, forensic investigation, complex mathematical models — and often a good deal of guesswork. It can vary radically from place to place and day to day, pushed up or down by local conditions and human behaviour.
  - R0 can drop when we do social distancing, for example under 1, but the moment we stop doing that the number goes up to for example 2.5. So the Ro depends partly on how we act ourselves!
- Be aware!
  - The metric can be “easily misrepresented, misinterpreted and misapplied.”
  - There is no consensus for how to measure it. Much of the underlying math relies, by necessity, on educated guesses and on human factors that can change unpredictably.
- For this reason, most diseases are given a range, rather than a single figure. SARS is usually described as having an R0 of 2 to 5 — an enormous difference. For Covid it is between 2 and 2.5!

What is the underlying risk that lies ahead of us!

- **Countries now use R rates to show the effect of social distancing. This is really tricky!**
  - An **R <1 shows the virus is only decreasing in growth** but **the virus is still there**! It only makes it easier to control!
  - **Decreasing the R** can be done by **social distancing** but **the moment you stop it goes up again**! R > 1 creates exponential growth which is more difficult to control!
  - **Controlling the R in combination with an exit strategy** could work to increase herd immunity and stop the virus!
- **Social distancing itself doesn´t stop the virus.**
  - Only **if all countries worldwide close their borders, put every one in their homes, stop living**, the **R goes** in time **to zero**! That is what is needed to **stop the virus**!
  - Only if **all countries reach a R = 0** then the **virus can be stopped**. That is almost impossible!
  - **Herd immunity is the best alternative even not knowing how effective this would be!**
  - Herd immunity **only works of all countries reach their immunity**.
  - If we reach this **herd immunity before a vaccine is found or not, it helps us by lowering the risk on spread.**
    We need to start **opening up the country in a controlled way** and start their normal lives!
    We can´t afford to wait for a vaccine.
- **Stopping this virus** worldwide is **a huge task** and almost not possible **without a vaccine** but **stopping living brings a far bigger risk** as in **controlling our society** by **making the rules to strict**. Especially when it becomes clear that we are getting ´the virus under control´ by showing a R around or even under 1!
- **The moment we think the virus in ´under control´ we could make the biggest mistake!**
  - The second wave caused in 1919 50mln people their lives because of that. If for example 1000 people are still infected and not registered (slide 19), with no social distancing we could end up in infecting our entire in a very short time. That´s our Armageddon!
- **That is the biggest risk and biggest fear for Government leaders at this moment and the reason why they try to create new rules. This is a self for filling prophecy! Be aware!**

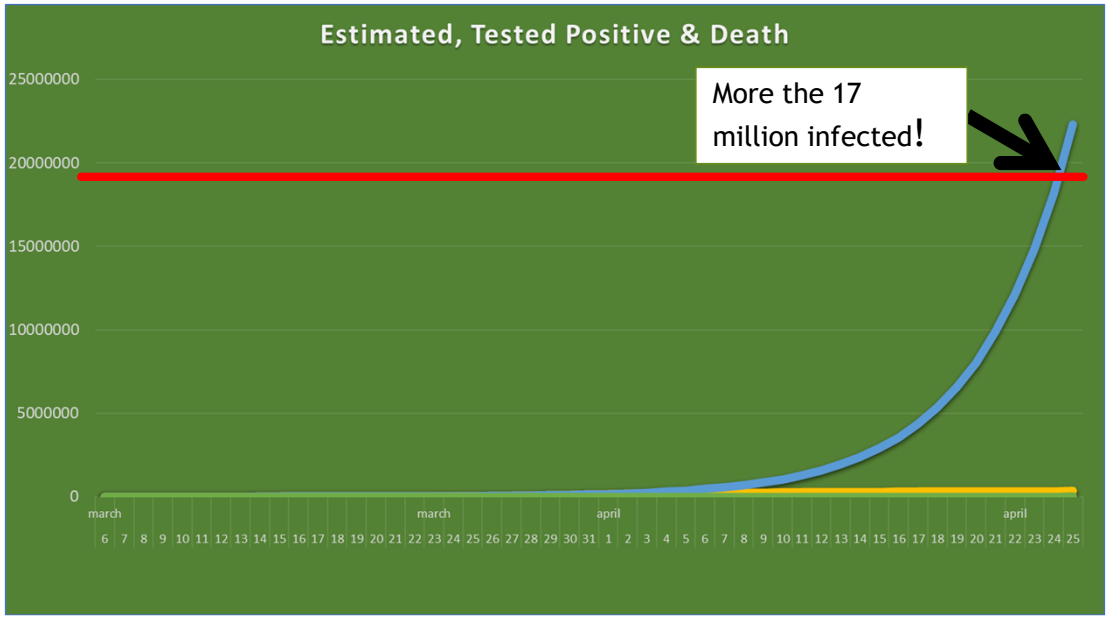
How does the R develop in the Netherlands?



The R is controlled but is it enough?
Not addressing that without the right exit strategy could lead to a disaster! (slide 19)

- By taking measures (social distancing) the Effective R can decrease
- When the R <1 the number of cases of infection decreases. But it it still there . To stop the virus a threshold of 60% is needed!
- For :Covid-19 this means R0 = 2.5 so threshold HIT : 1-1/2.5 = 60%

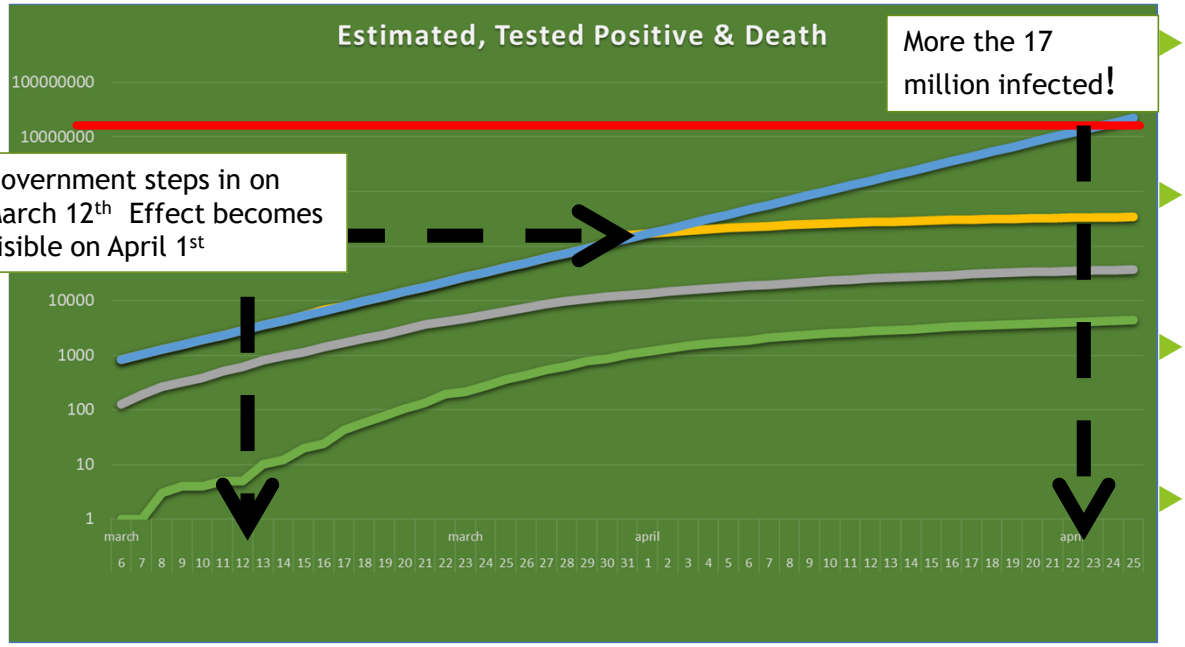
Analysing the data (did we do the right thing?)



- Using R0: 2.5 and average infection time 4.5 days we can make a prediction on how the curve would go!
- With no action the whole country would be infected on 24th of April! The Blue line!
- That would result in dramatic situations!

- To understand the impact better we use a different X- as (logarithmic)
- This makes it easier to see how Government measures had it´s effect!

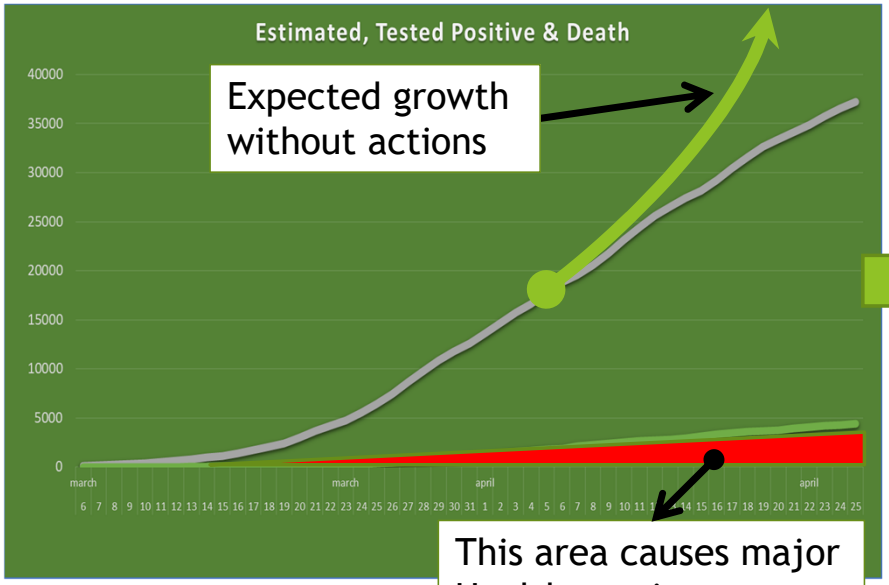
Analysing the data! (logarithmic scale)

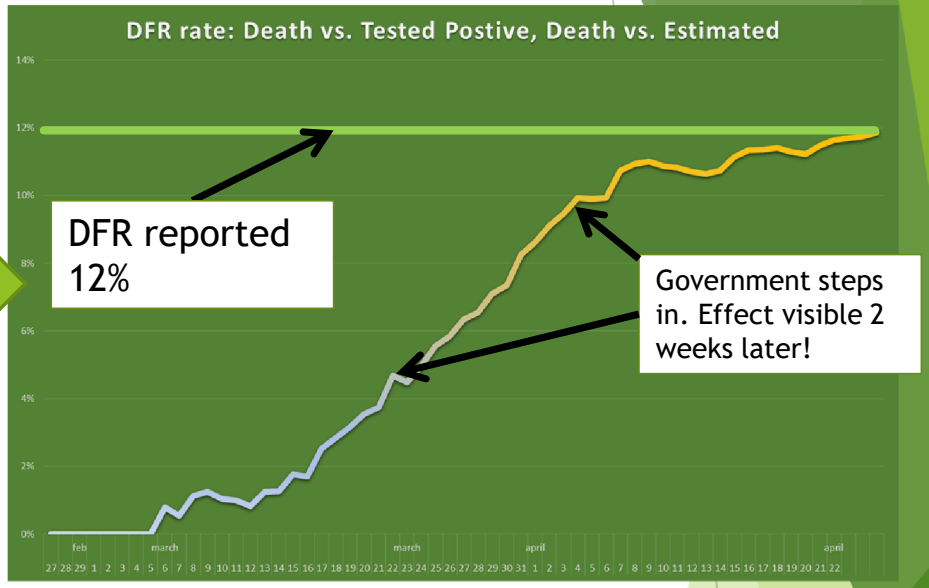


- With no action the whole country would be infected on 24th of April! The Blue line!
- Using a few data point, 12, 16, 31 of March and 22, 29 April we calibrate a new curve!
- The date above where used for checking where the effective R was changing!
- On March 16th the effective R went to 1 but the the effect of the curve can be seen 2 weeks later (April 1st)

- With a different X- axis more becomes clear.
- The Yellow line shows that the measure the Government made where effective
- The Pink (the registered infected)and Green (the casualties)

Analysing the data! (focus on the Pink & Green line)



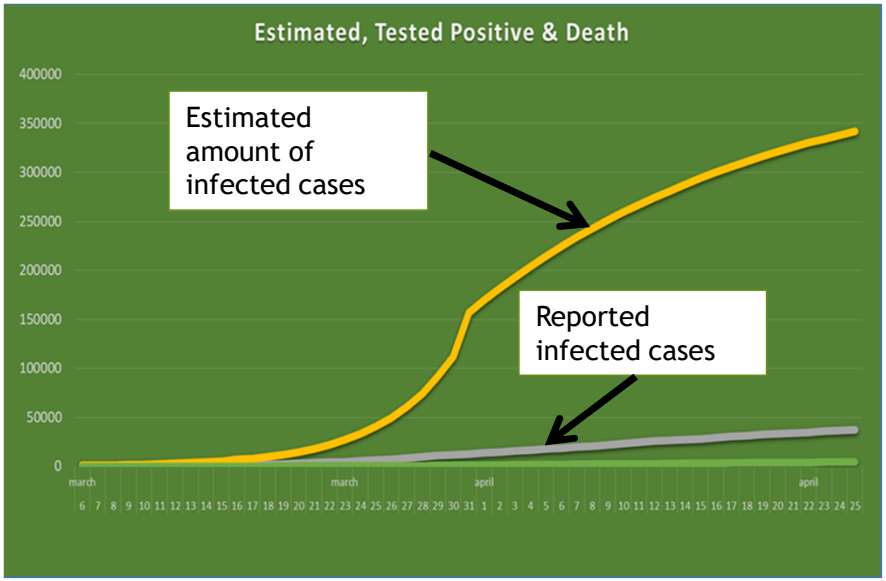


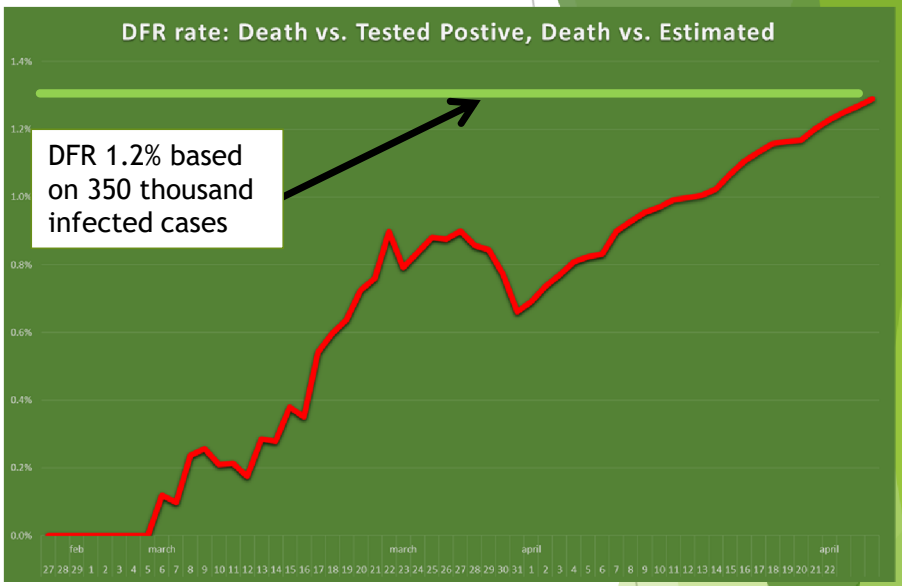
- Again The Pink (the registered infected) and Green (the casualties) now in normal scale
- Just the green line is already causing major issues in the Hospital. People that has been in de IC was in total 2800

- The DFR mortality rate curve (Green line / Pink Line) started exponentially but slowed down.
- The rate start declining when the Government stepped in (delay of 2 weeks)
- What does the line represent?

The DFR is 12%. That seems to high. Maybe this % gives only an indication on how much is tested so far!

Analysing the data! (Can we estimate the DFR ?)

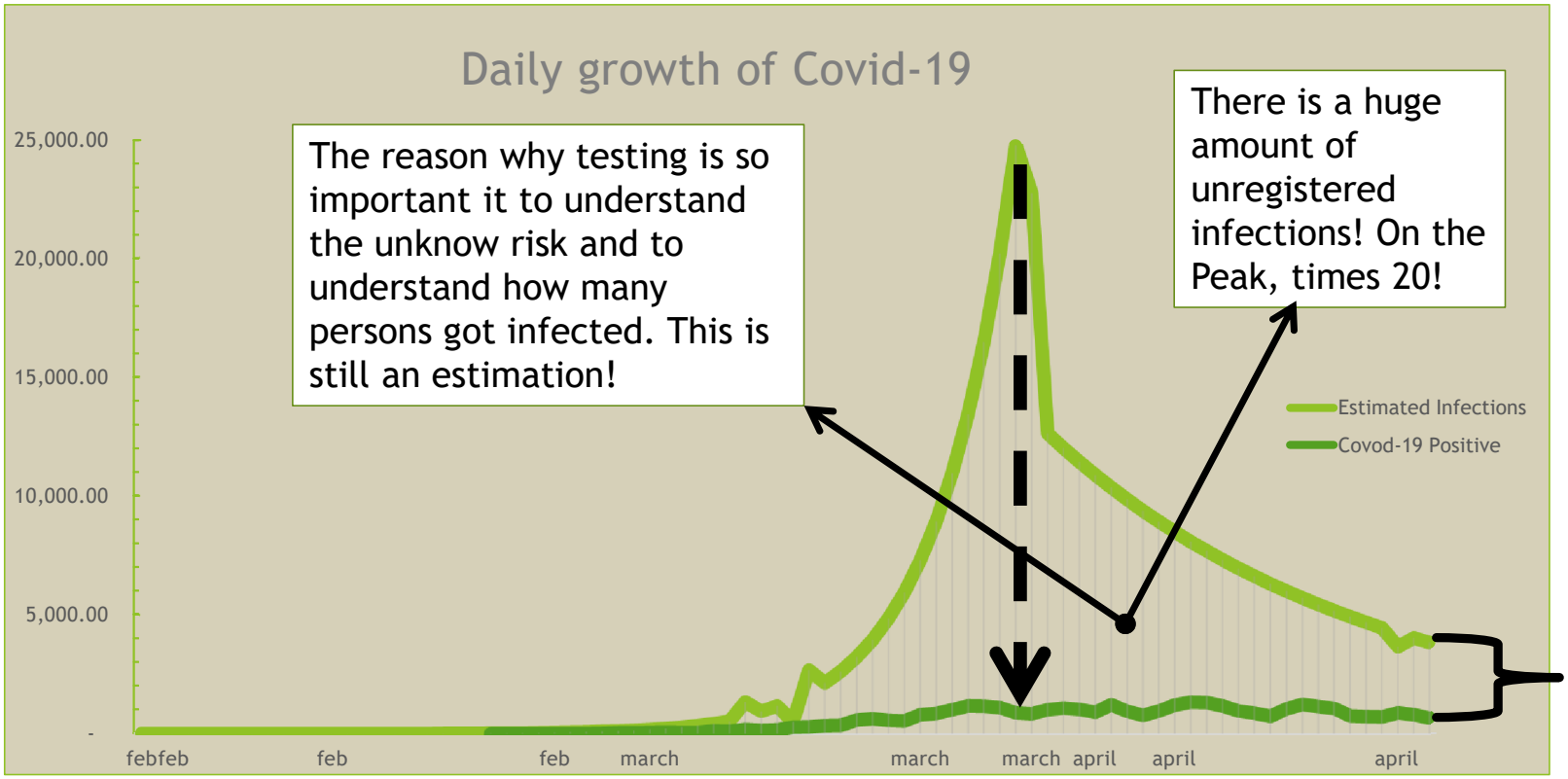




- Estimated amounts are substantially higher than reported! This model estimates 350 thousand cases (yellow line from slide 15 in normal scale)
- This is close to the 3% immunity that RIVM has been testing which is ½ a million!
- The DFR of 1.2% which seems higher than what we see in other countries in Europe (except the ones who were hit heavily)

- **The DFR is considerable lower than 12% reported! 1.2%**
- Is that a more representative percentage?
- Some reality checks are done to conclude this number is probably still too high! Slide 26
- But is it also 1.2%!
- 0.8% would fit better and is also in line with the ½ million cases that are immune(3%)

Analysing the data! What is the underlying risk?



Choosing the wrong exit strategy could end up in a second wave. Basically everything starts again but now with more infections as a starting point leading to a quicker boost in infections!

Be aware of the Unknown Risk! Still every day infections!

- According to the model we reached the **peak of** the estimated infections on March the 30th with a total of 25 thousand a day! After that the curve dropped
- This is almost **2 weeks earlier than the peak on the registered cases which is expected** since more is happening under water!

Analysing the data! (Questions remain)

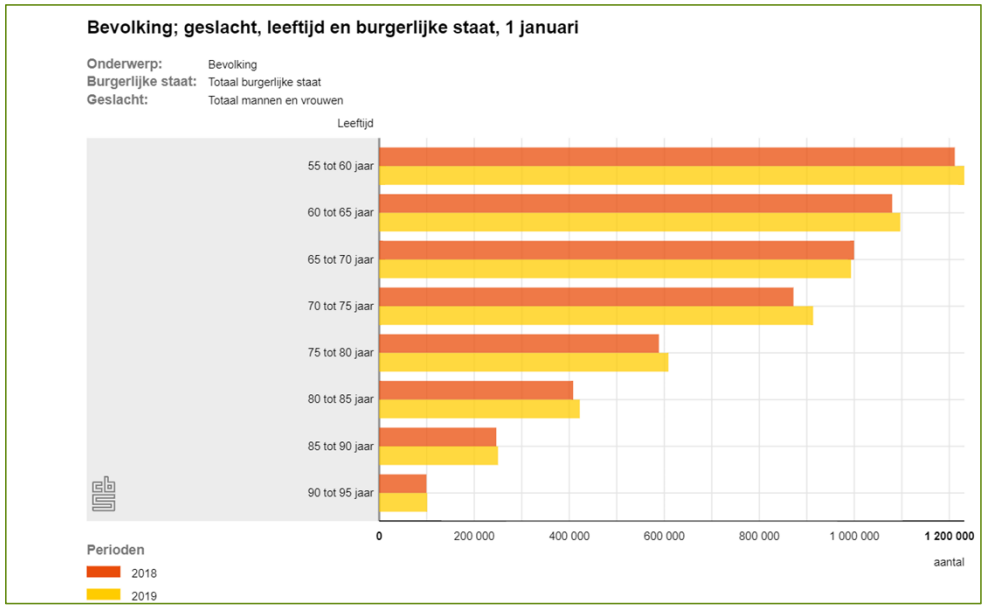
- **What is the exact number of people that died because of Covid?**
  - We now see the reported ones, but what about the ´hidden` unreported ones
- **How many (%) died because of an underlying condition?**
  - Very important since this gives us an starting point for the exit strategy!
- **Which persons got tested ?**
  - If you test people while the country in in lock down, you can expect a low number and it doesn't represent the real world
  - If you test the average population then it gives a good representation but is this also done?
  - If you only test the death ones it only confirms your count. You can then also determine what the cause was (pre existing condition?)
  - If you test only the suspected cases you will miss out on the whole picture. How is the country infected.
- **What is the DFR rate based in the real death?**
  - And can you just take the total amount and divide it by the amount of cases or is it more complex than that!
- **What exit strategy can we use?**

Analysing the data! (What we know so far)

- The population of the Netherlands per age cohort (5 years)
- The amount of persons died per age (source RIVM)
- We don´t know who has an underlying condition
  - Diabetes, Lung Disease, Cancer, Immunodeficiency, Heart Disease, Hypertension, Asthma, Kidney Disease, and GI/Liver Disease.
- We do know the DFR world wide based on amount of test (0.9%)
  - Tested 23 million on 3.5 billion population) ➔ (China, Russia, India & Iran excluded)
- We do know the amount of people died worldwide with an underlying condition (99.1%) (0.9% no underlying condition)
- New York (with no social distancing in the beginning show similar results)

How can we estimate the amount of casualties and what exit strategy can we use?

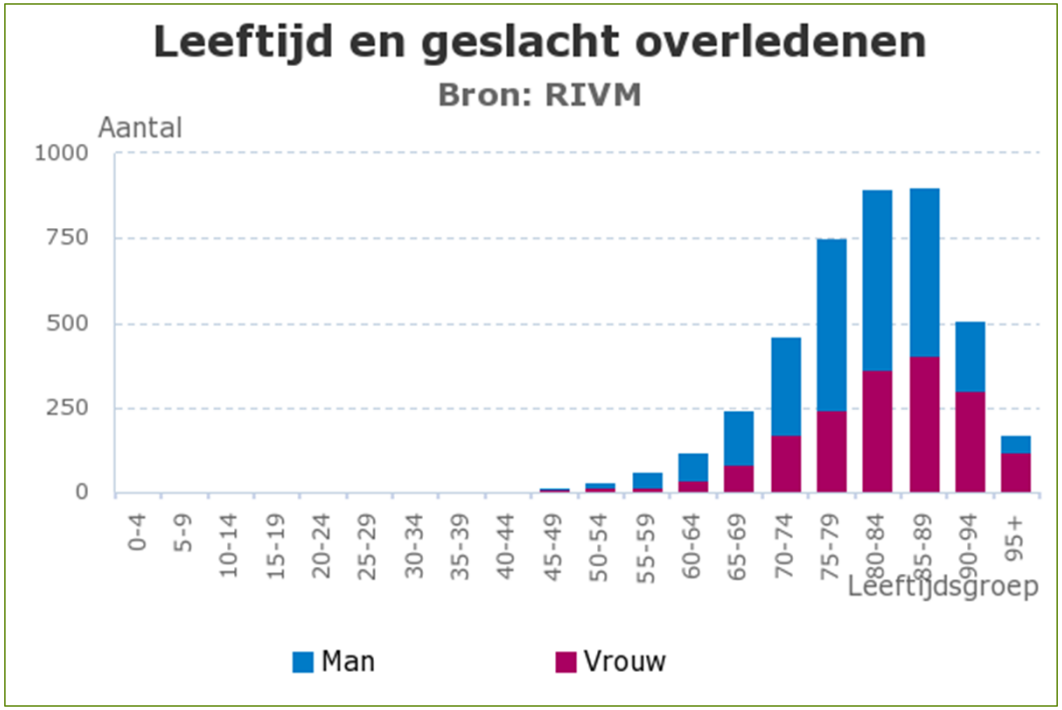
How is the Netherlands divided in population source: CBS (statline)



Amount of people between 55 and 95 years old in (2019) equals 5.6 million

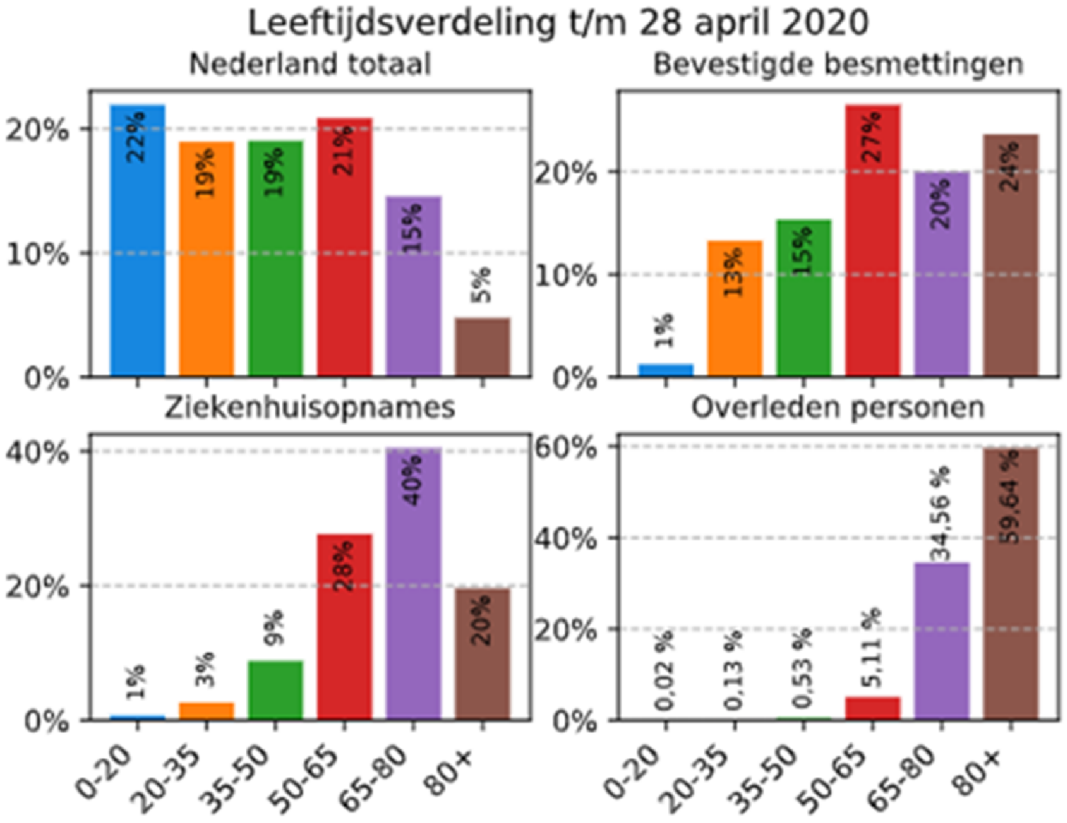
Amount of people between 15 and 55 years old in (2019) equals 7.8 million

What do we know? Source RIVM



Source RIVM 22th april:
Amount of people that died : 4176
Younger than 55: 62
55+ : 4114

Last statistics 28th April RIVM



Graph 1: How is the population divided (More details see Slide 22)
Graph 2: How are the positive cases divided per age
Graph 3: Which percentage per age went to the hospital (probably the 3% of the worldwide serious or critical condition)
Graph 4: The amount of fatalities per age (more details see Slide 23)

Assumptions needed for Exit strategy

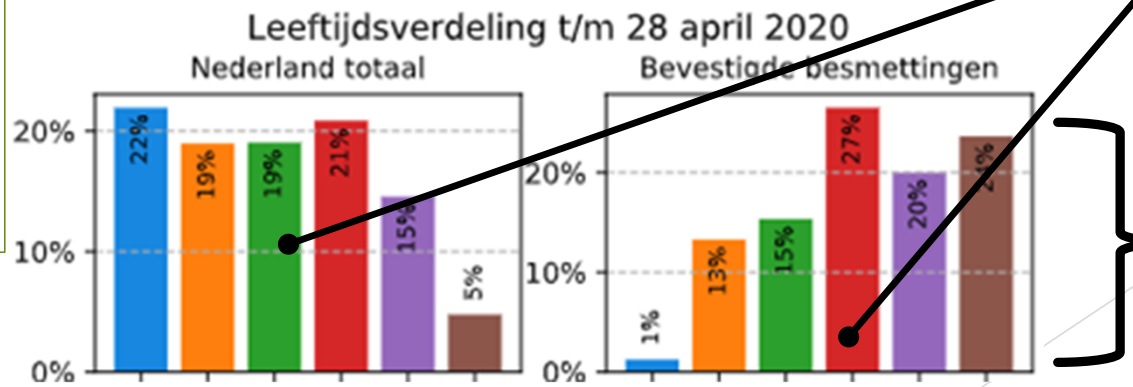
In the reports the amount of tested cases is used. (200 thousand).

- Roughly 40 thousand got tested positive and 4 thousand died from the virus.
- We know how the dead are divided by age but what we don´t know is:
  - How the rates are divided by age from the:
    - 160 thousand that where tested negative
    - From the unknow group that is not tested where we only have an estimation on how many there are.
- Is it possible the overall DFR will be higher than when separated per age?

In the picture below the problem is explained visually.

- The Dutch population as a whole is more is more weighted towards the 65 years and the test found positive more beyond the 65 years, which will have an effect on the exposure (the impact) on each age and there for the DFR overall!

Can we assume that the virus spread evenly over population or should it be according to the way the positive cases are found! Or does it not matter?



How many cases are undetected and are they equally divided over the population or more in the direction the second graphs ? The positive ones

200 thousand tests have been done and based on that **40 thousand** cases have been found positive. How is the rest (160 tested cases) divided over the age categories?

Assumptions needed for Exit strategy

To understand more about the DFR (mortality rate) on high level we will use 3 types of data sets.

- The estimated 360.000 cases based on slides 17 & 18
- The estimated ½ Million cases based on 3% Immunity
- An educated guess to understand the sensitivity of the results (1 million cases)

The amount of tests define the overall DFR (mortality rate)

Now we need to know how these rates are divided by age to calculate the exposure!

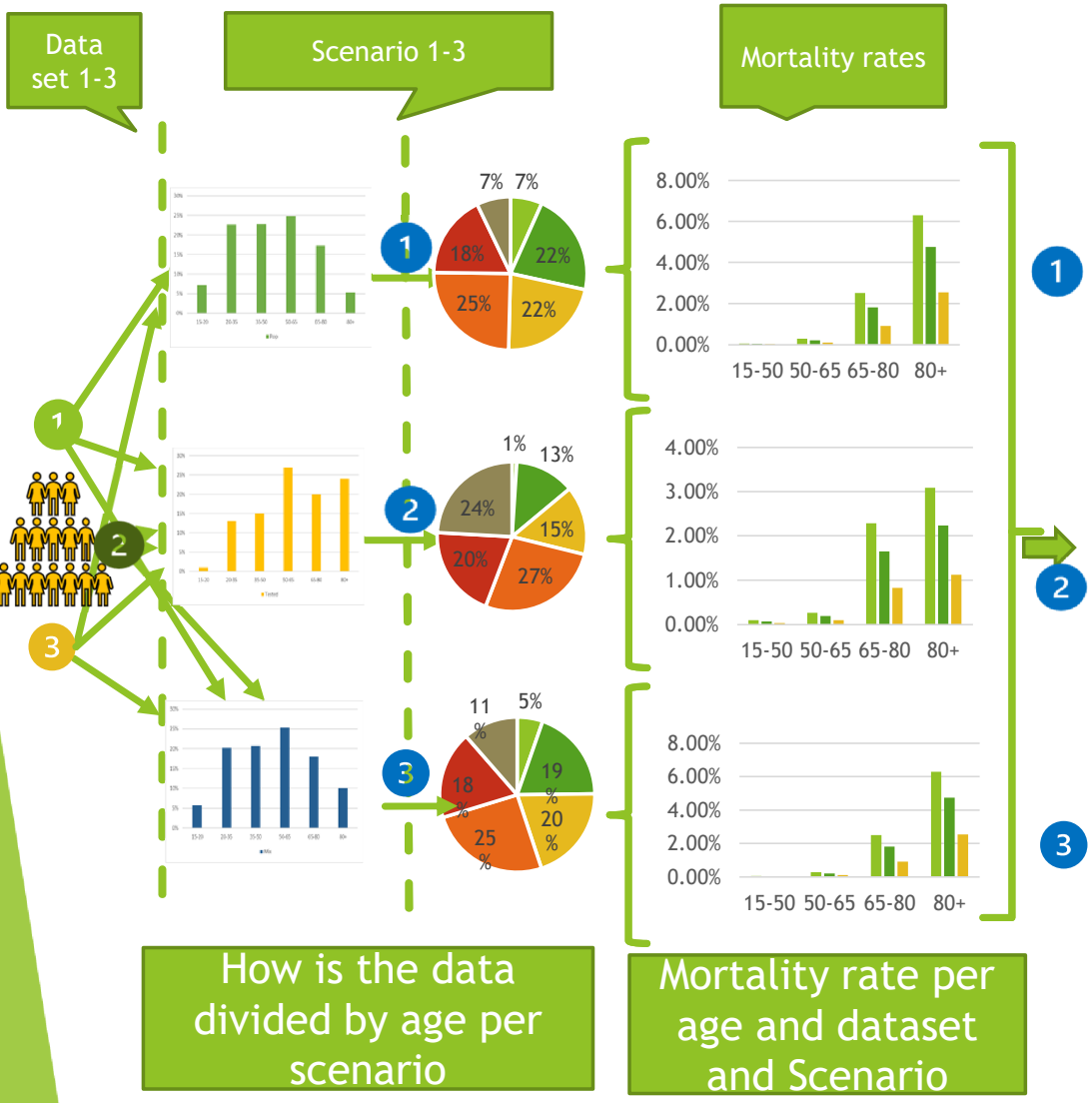
To do this we need to make assumptions! Therefore we define 3 scenarios.

- Scenario 1: Assume that the amount of cases are a reflection of the current population.(slide 23,Graph 1)
- Scenario 2: Assume that the amount of cases reflect the amount of positive cases so far. Input for this scenario is slide 23,Graph 2
- Scenario 3: A combination of the above scenarios. In this case we assume the weight is:75% the outcome of scenario 1 + 25% the outcome of scenario 2

Reasoning: In the beginning you test only the ones that show symptoms, then you test all the persons involved, So you testcases will be close to scenario 2

The more you test, the more you will also test you the more you will test the cases that reflect the current population (scenario 1) and therefor the weight will shift towards that direction.

Results



How is the data divided by age per scenario

Mortality rate per age and dataset and Scenario

What is the exposure per scenario, dataset and age

Scen 1	dataset 1	dataset 2	dataset 3
15-20	78	31	15
20-35	320	181	89
35-50	1,405	840	413
50-65	9,914	7,404	3,704
65-80	61,034	47,198	23,865
80+	36,144	58,804	33,704

Scen 2	dataset 1	dataset 2	dataset 3
15-20	296	212	106
20-35	426	305	152
35-50	1,729	1,239	617
50-65	9,557	6,854	3,418
65-80	57,444	41,434	20,813
80+	23,872	17,258	8,695

Scen 3	dataset 1	dataset 2	dataset 3
15-20	57	40	19
20-35	284	202	99
35-50	1,285	913	451
50-65	10,103	7,259	3,628
65-80	63,003	45,612	23,021
80+	48,650	36,711	19,606

Estimation of death over the population between (20-95)

In this group 50-55 gives a result of 1045 !

Scenario 3 and gives an estimated amount of 1150

Adding possibility of comorbidity see slide 25 will lower the results even more!

Based on ½ million cases for the age under 55 the exposure is still 50% less the tot total sum of casualties now!

Covid 19 What we know (Comorbidity) (Source worldometer, 22th April 2020)

PRE-EXISTING CONDITION	DEATH RATE confirmed cases	DEATH RATE all cases
Cardiovascular disease	**13.20%**	**10.50%**
Diabetes	**9.20%**	**7.30%**
Chronic respiratory disease	**8.00%**	**6.30%**
Hypertension	**8.40%**	**6.00%**
Cancer	**7.60%**	**5.60%**
no pre-existing conditions		**0.90%**

*__Death Rate__ = (number of deaths / number of cases) = **probability of dying if infected by the virus** (%). The percentages **do not have to add up to 100%**, as they **do NOT represent share of deaths by condition.**

AGE	Number of Deaths	Share of deaths	With underlying conditions	Without underlying conditions	Unknown if with underlying cond.	Share of deaths of unknown + w/o cond.
0 - 17 years old	3	**0.04%**	3	0	0	0%
18 - 44 years old	309	**4.50%**	244	25	40	1.00%
45 - 64 years old	1,581	**23.10%**	1,343	59	179	3.50%
65 - 74 years old	1,683	**24.60%**	1,272	26	385	6.00%
75+ years old	3,263	**47.70%**	2,289	27	947	14.20%
TOTAL	**6,839**	100%	5,151	137	1,551	24.68%
			75%	2%	23%	

- COVID-19 Fatality Rate by COMORBIDITY:
- *Death Rate = (number of deaths / number of cases) = probability of dying if infected by the virus (%). This probability differs depending on pre-existing condition. 0.9% has no underlying condition

- Age of Coronavirus Deaths: Based on the data from New York City Health as of April 14.
- The underlying illnesses include Diabetes, Lung Disease, Cancer, Immunodeficiency, Heart Disease, Hypertension, Asthma, Kidney Disease, and GI/Liver Disease.
- No underlying illness DFR 25% : in the area 55- appr. 5%

Is the analysis done accurate? Reality checks

Compare the DFR reported with the DFR based in tests done!

- In the model used in slide 24 the estimated **DFR for ½ Million** Infected casus scenario 3 **equals 0.85%**
- Us, World except Russia, India, China & Iran show similar DFR based on tests (~1%) : Light Blue
- Europe without Russia, Spain, Italy and France show a DFR of **0.78%** : Light Blue
- Spain, Italy, France show a DFR rate of 2.1% (double of US and worldwide!) : Blue
- France: The DFR is 4.9% which is extremely high! Is this due to lack of testing? (1% of the population so far)

Country,	More specific	Total	New	Deaths/	Tests/	Test/		Mortality rate	Chance of testing postive if tested	
		Cases	Deaths	1M pop	1M pop	%	Poplation	DFR		Reported DFR
Europe	North	664,461	988	2,596	424,710	2%	268,064,034	1.4%	14.0%	10.1%
Europe	East	154,957	137	799	245,066	1%	307,261,680	0.1%	3.7%	2.1%
Europe	Mediterian	454,880	578	1,111	196,067	3%	135,088,580	1.5%	13.1%	11.2%
Sweden	North	18,640	2	217	9,357	1%	10,099,391	2.3%	19.7%	11.8%
France	North	162,100	242	350	7,103	1%	65,276,925	4.9%	35.0%	14.1%
Spain	Mediterian	226,629	288	496	25,656	3%	46,755,067	1.9%	18.9%	10.2%
Italy	Mediterian	197,675	260	441	29,071	3%	60,460,906	1.5%	11.2%	13.5%
Europe	All except France & Sweden	1,093,558	1,459	3,939	849,383	2%	635,037,978	0.8%	9.2%	8.8%
1	Italy, Spain, France	586,404	790	1,287	61,830	2%	172,492,898	2.1%	17.1%	12.4%
2	Europe except 1	687,894	913	3,219	804,013	2%	537,921,396	0.5%	7.6%	7.1%
Europe	(2) Europe except Russia	606,945	847	3,214	784,294	2%	391,986,055	0.8%	9.8%	8.0%
USA		983,298	1,077	167	16,440	2%	330,997,384	1.0%	18.1%	5.6%
World except India, Russia, China,Iran		2,775,394	3,304	6,504	1,479,505	1%	3,427,198,770	0.9%	12.1%	7.2%

Is the analysis done accurate?

Looking at the data so far more reality checks:

- We have an great experiment (unfortunate) in the Princess Diary Cruise ship
  - 13 people died out of 3711 (1.83% DFR)
  - Population was skewed (if you create a histogram) to the right
    - 50% over 70+& 33% of 60+
  - Chance of infection was 100% due the bad conditions but only 712 got infected
    - 80% seems to be not infected! Why?
  - Project these numbers on the Dutch Population:
    - 4.5 million at risk (20% infected : 900 thousand possible at risk)
    - 11 death in the category 60+ ➔ 50 thousand death!
    - These numbers are in line with the table in slide 24 (55+)

Conclusion: The reality check seems to show that the numbers are in line with the models used!

General Conclusion (1)

Governments did the right thing! The analysis showed the virus slowed down.

- Measurements are in place to monitor the R and so our social distancing
- **Countries begin start to open up** which is a good thing
- **The risk is that this happens without showing the real risk and what could still go wrong!**
  - To reduce the risk all kinds of rules are put into place
    - A world where we have to keep distance (the 1.5 m society)
    - All kinds of safety procedures and rules on how maintain the R low
    - All kinds of consultancies are already thinking about how the new world should look like!
- **The biggest risk** on all this is that **we will eventually become ignorant** because the **numbers are good!**

Now governments are trying to create a new world. Based in the fact that the R must be controlled and that the healthcare system can not collapse!

This could end up in a total disaster!

- It is almost **impossible to create a 1.5 m society in restaurants and bars**. Even so for events…
- Holding on to **creating a controlled society will eventually backfire** and we forget about the risk that is burning below our feet. (slide 19)
- **The virus will stay among** us until a vaccine or herd immunity us reached.
- If **we do not handle the underlying risk** with care the whole process will start again creating bigger problems then ever before.

General Conclusion (2)

- **The models don´t lie!** The Corona virus unfortunately discriminates!
  - There is a huge risk difference between ages! (55 – or 55+ is factor 50x!)
- The Corona virus does not only discriminates on age. Also on:
  - Underlying illnesses include Diabetes, Lung Disease, Cancer, Immunodeficiency, Heart Disease, Hypertension, Asthma, Kidney Disease, and GI/Liver Disease and Obesity.
  - Elderly people with no underlying conditions enjoying their pensions or just enjoying the last part of there lives by travelling around the world…
  - Elderly homes, There are in an area that is mostly packed together inside with possibly bad air conditions or air quality
  - The age 55-65 that are still part of our working economy and also want to be part of it during this crisis!
  - Big events or enjoy the night live in the local bars and restaurants or religious events(church) or other big gatherings
  - Children that needs go to school or play around and be a child! That possibly infect others like there grandfather or mother.
- **The group 55 and older predict between more then 100 thousand people dying!**
- **For the group under 55 this is between 2000 &3000 on the whole population!** (combination of Scenario 3 & dataset 1&2 on slide 12 (2nd table)
  - The number in the group under 55 may even be lower! The % of casus with an underlying cause has not been taking into the calculation. If the numbers for NY would apply the amount of casualties would be considered lower! (New York has 5% in the 55- without underlying conditions)
- Testing & Monitoring is key will help in discovering the unknown risk. Not knowing can create a boost in infections especially when the R > 1!)
- Herd Immunity of a Threshold of 60% should be the goal while a vaccine is not available!
- The sooner we start the less impact this has on our economy !

General Conclusion (3)

Many questions are still not answered

- What about the Princess Diary Cruise ship. All persons on board could have been infected but the ratio was only 20%. Could that be the case in general?
- Is it possible the virus lost it´s power because it has been mutating a lot already?
- It is clear that many people got ´infected´ but was it enough to create anti bodies?
  - Studies show that only 3-4% of the population has anti bodies and thus ´protected 'against the virus
  - That means that we have a long way to go and herd immunity might not go as fast as we wish!
- Is it true that big events and mass gatherings are the offspring of the spread?
  - It looks like that the virus spread because of Carnival, Ski holidays with après ski, International woman's day or big international games. Also place that are crowded or small villages, villages where religion plays a dominant role, where many contacts are made to spread the virus faster. There is also research done on drop lets spread in the air. Also air quality could play a role in how the virus stays airborne. It is clear that the virus can hang in the air for a longer time then expected.
- Is it true that a good ventilation can stop the spread better? Also here studies show that this does have an impact.
- Is the strategy Sweden choose the right one? Making people self aware and stopping big event early. Or could it be that the healthcare system is prepare Maybe it is worth investigating or even trying!

So many questions remain but …

are we waiting for the answers or are we relying on the scientists to find the answers while we start our live again as normal as possible.

Conclusion Exit strategy (First directions)

- **Make people aware of the risk that they have!**
  - It is still a serious matter and people do die from it. But too much pressure in keeping the risk under control is just not manageable!
  - Create an app to help people to guide them in what they could do to make the choice they want to make
  - Help businesses in how they should organize themselves. Not only by making general rules but also rules that are effective based on the situation. Let´s think smart and use our common sense!
- **Discrimination by ´locking´ people up or keep them at home is not the solution. Also opening up without a plan and a goal is not a good idea!**
  - The risk shows clearly where we are vulnerable!
  - The numbers speak for themselves and so we could try to relay on the self awareness of each individual
- **Rules are needed to make sure we keep the R ´under control´ but that doesn't mean we need to stick to R=1 ! We also need to live. If we do this, everyone that has a bigger risk, will be more carefully and act accordingly to this**
  - Social distancing will come automatically and without written rules
  - Children should go to school without too many social distancing rules (Let them be kids, the Risk for them is very low!)
- **It is time for the governments to step back and work in background! Measuring the R and how the herd immunity is going and if needed step in again!**

Conclusion. What is our choice?

Should we hold in to fear and create the 1.5 m society or are we embracing it and incorporate it in our daily lives!

- Based on all the analysis the answer lies in the middle.
- It is not wise to create a ´totalitarian 'state based on strict rules. Our culture will not allow this and it will backfire risking that we start all over again!
- We cannot go back to our normal world but we can go back as close as possible!
- Using the knowledge and the fact we all make our choices based on what is right it is utmost important that we share the right knowledge and guide everyone in this new path towards safety!
- If we do this the the risk we face is minimal (the analysis shows this clearly)
- The virus does discriminate but we don´t have too when everyone knows the risk and the possible danger

There is no answer that safes us all but one thing is clear. We should start with creating herd immunity wheather it is effective or not

- If we all become aware of the risks involved we could get back to our normal lives without a made society where everything folds back to keeping the R stable, where we go out of control by creating a 1.5m society!
- Let´s not go that way!

So what are we waiting for: Giving in in fear or embracing it makes all the difference! Let´s embrace it!

Conclusion (remarks)

- The model that is used for estimating the expected cases should be analysed better, but the direction can be used. We should know the underlying condition of the ones that died & the ones in the IC on the respiratory machines.
- The exit strategy is depending on how Europe in general is opening up. We are an export country so we depend strongly on other countries. The sooner we start the better it is for the economy!
- Opening up the ´Horeca´ needs to be done in steps. Start small and make sure that the inside area is well ventilated. Rules are needed to see how many persons can be put inside, but we can not wait!
- Testing is key and should not be underestimated. Data is key!
- Showing data & answers in FAQ on the website creates more awareness that the direction chosen is the right one!