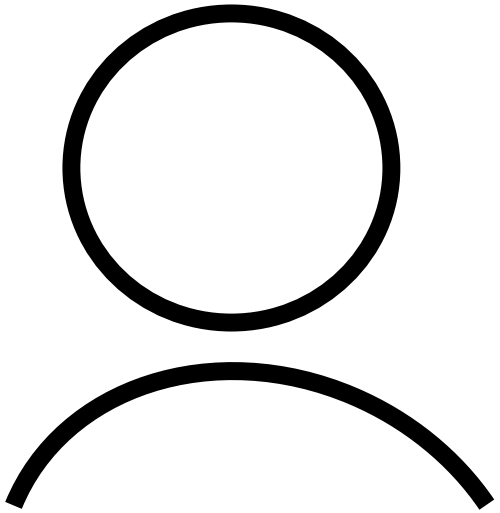
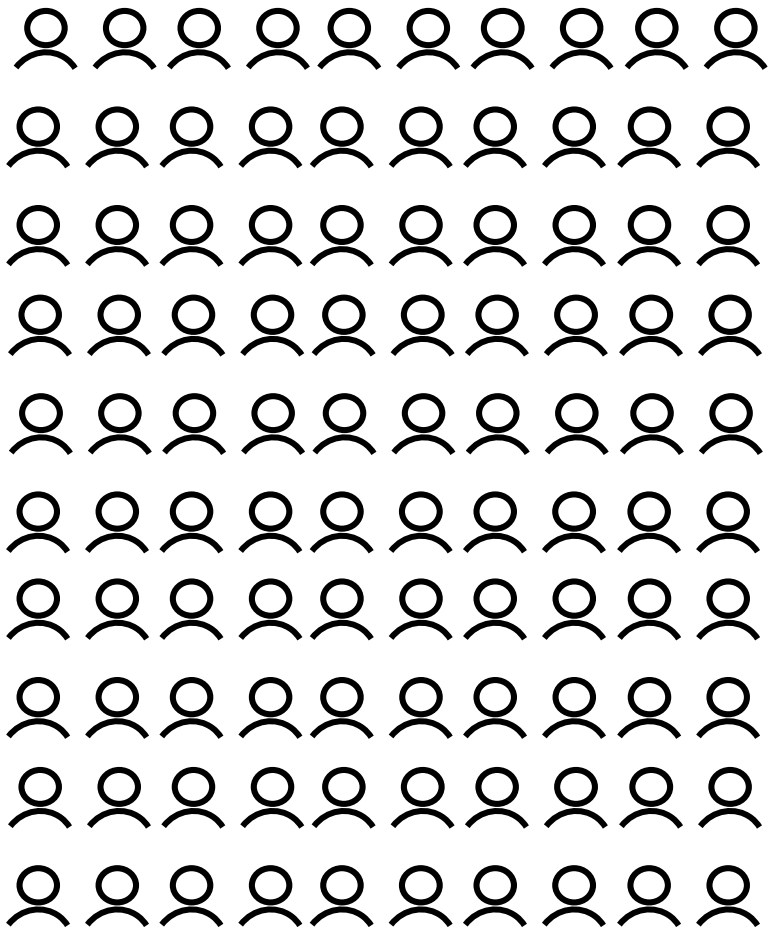


How do I make sense out of the numbers and graphs I'm seeing about COVID-19?

What's my personal risk?



Out of 100 people infected with COVID-19...

80% of cases are likely to be mild, and can be treated at home.

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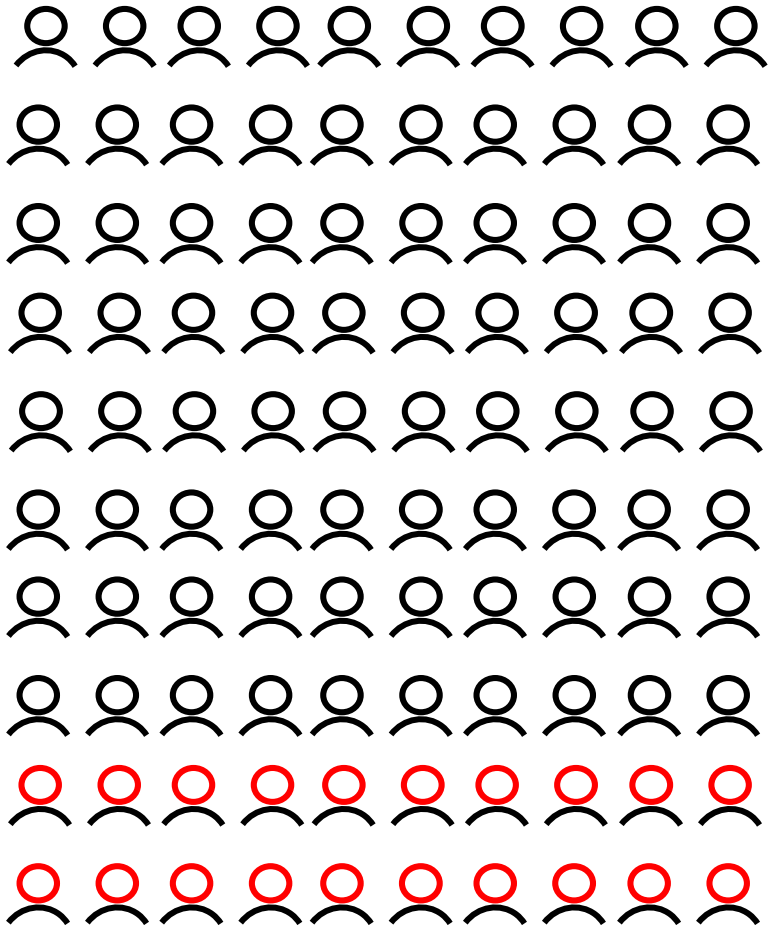
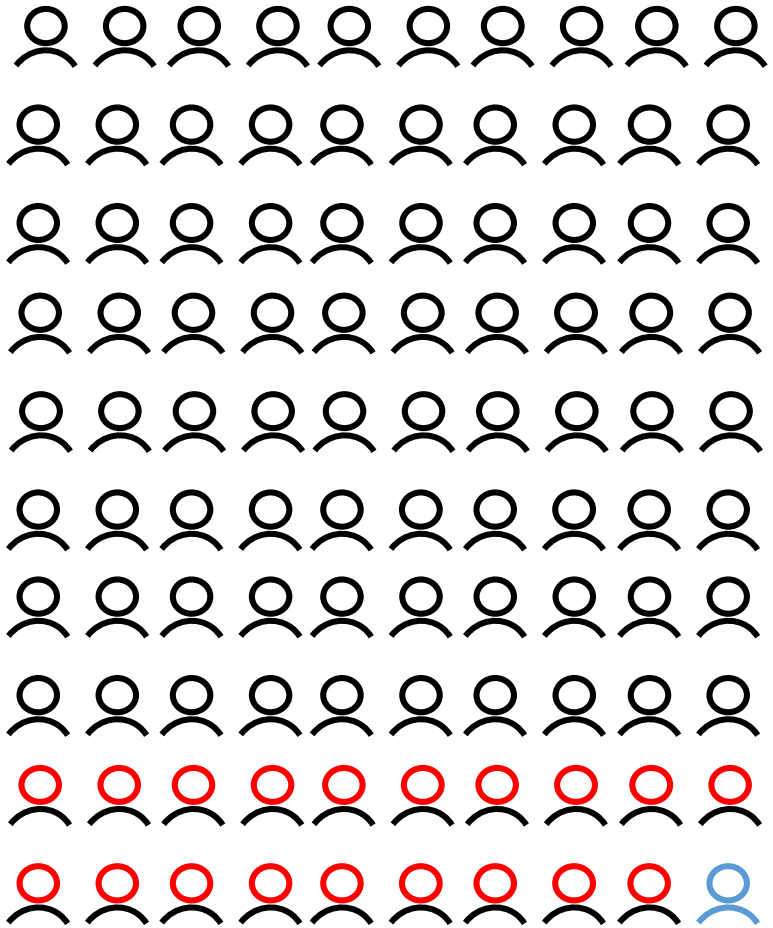
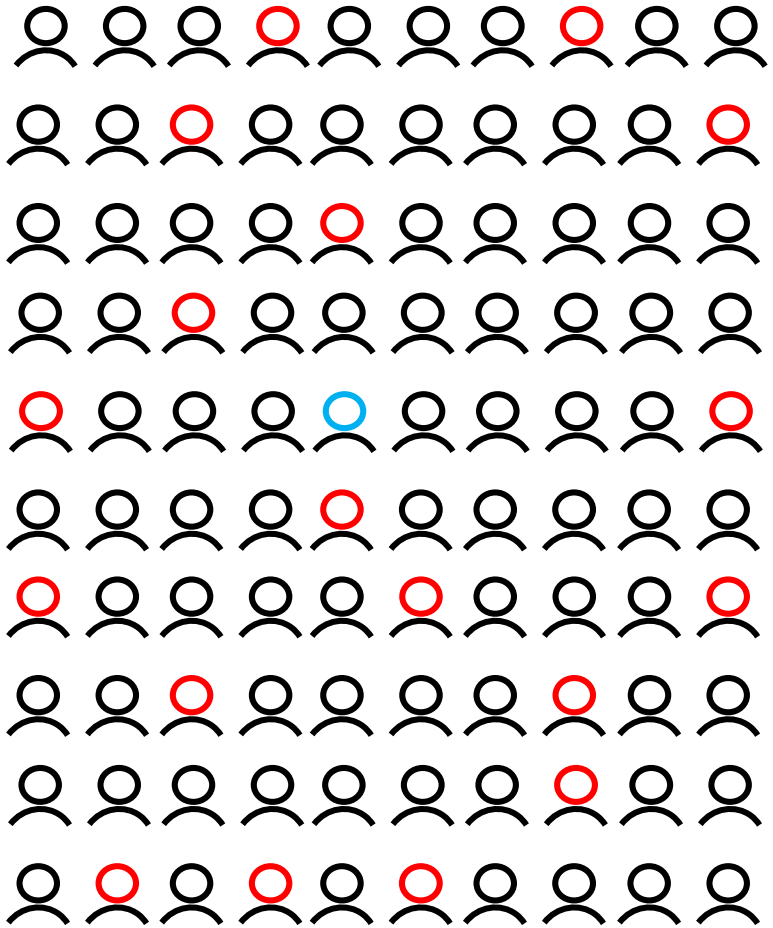


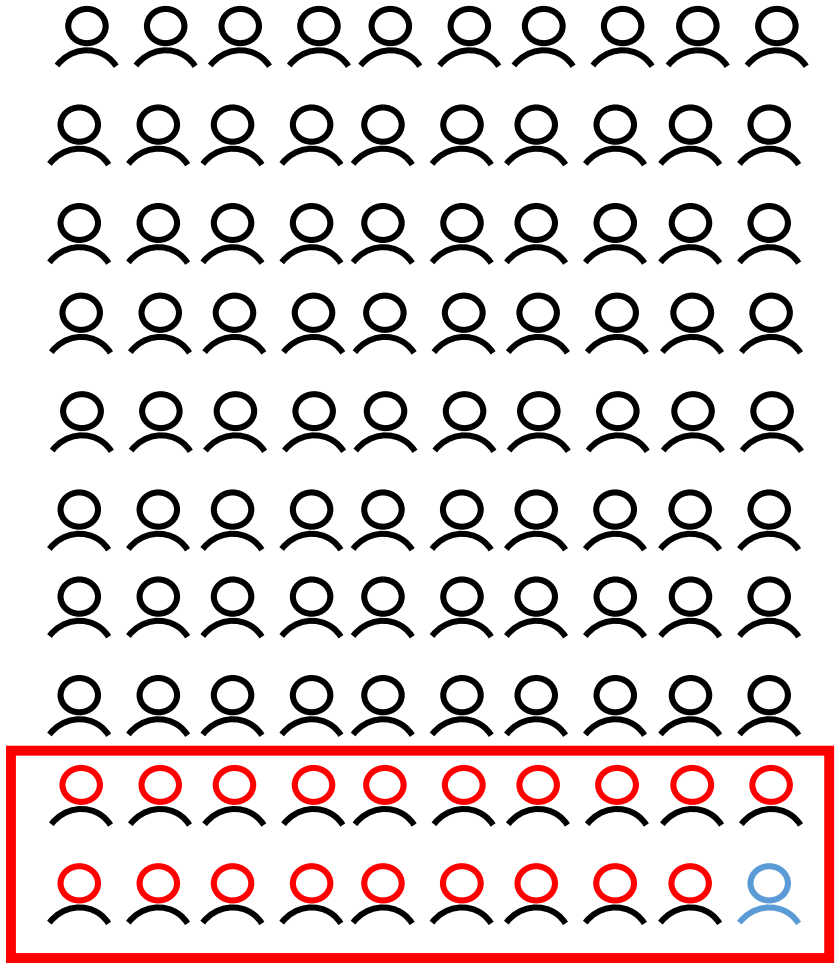
But, 15-20
of those infected
are likely to need
hospitalization,



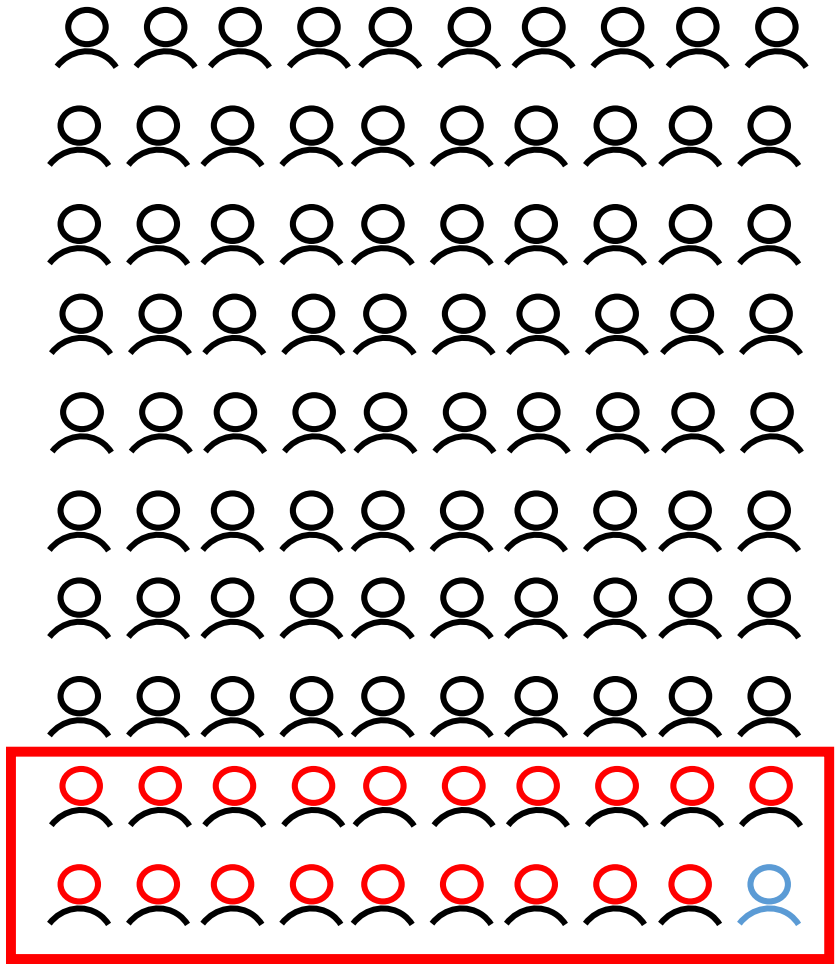
and 1 of those
15-20 infected
are likely to die.



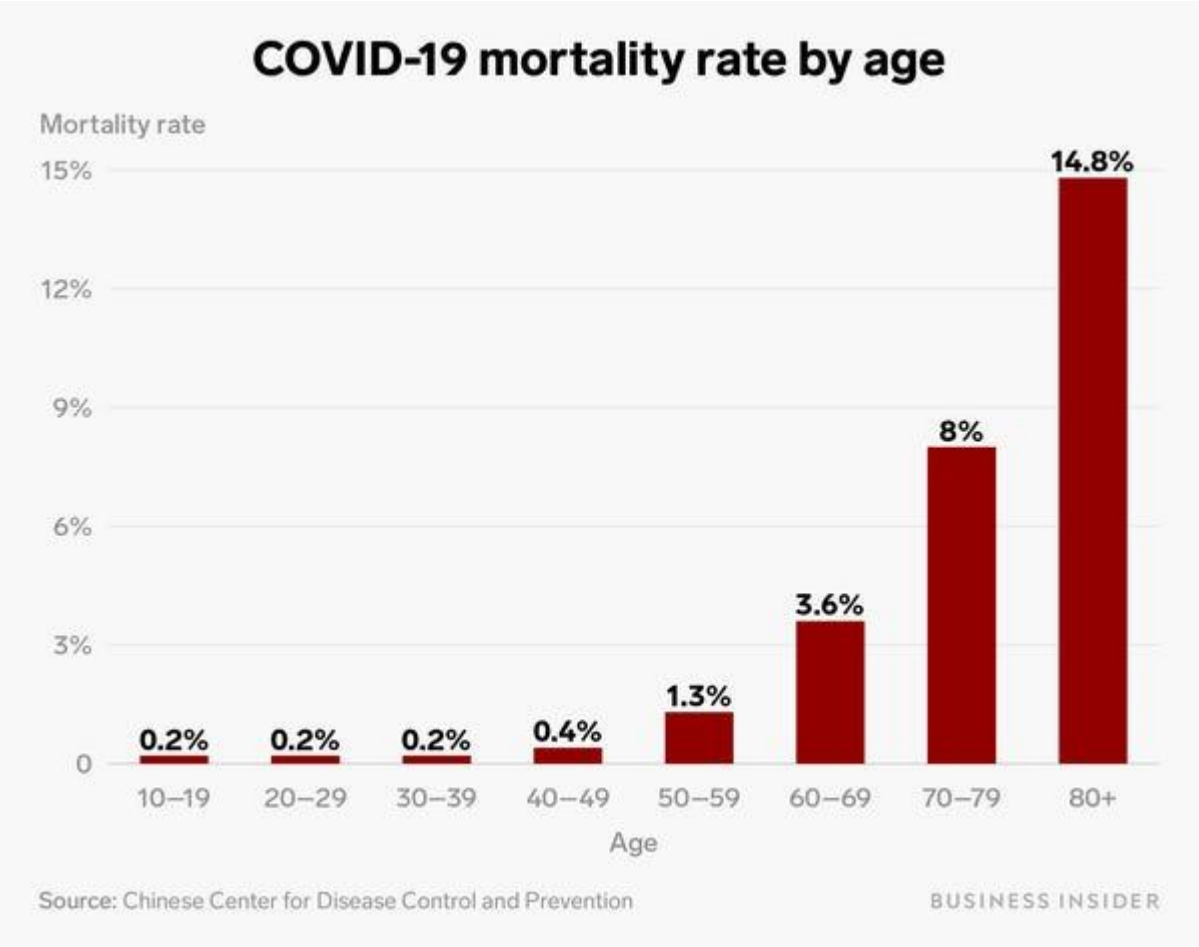
(Note: severity does not necessarily happen in the order that infections occur, it is random.)



So how likely are you to be among the 15-20 people infected who experience a severe case?



It depends.



It depends on:

- Age

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COVID-19 Fatality Rate by COMORBIDITY:

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PRE-EXISTING CONDITION	DEATH RATE confirmed cases	DEATH RATE all cases
Cardiovascular disease	**13.2%**	**10.5%**
Diabetes	**9.2%**	**7.3%**
Chronic respiratory disease	**8.0%**	**6.3%**
Hypertension	**8.4%**	**6.0%**
Cancer	**7.6%**	**5.6%**
no pre-existing conditions		**0.9%**

***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.**

Source: worldometers.info March 16, 2020

It depends on:

- Age
- Chronic illness

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But those two data sets are independent of each other.

What else do we know?

In a pre-print manuscript
(not yet peer reviewed),
data from 1,590 patients is
used to assess the potential
level of risk of having a chronic
illness and COVID-19.

Source: Comorbidity and its impact on 1,590 patients
with COVID-19 in China: A Nationwide Analysis
doi:10.1101/2020.02.25.20027664
March 16, 2020

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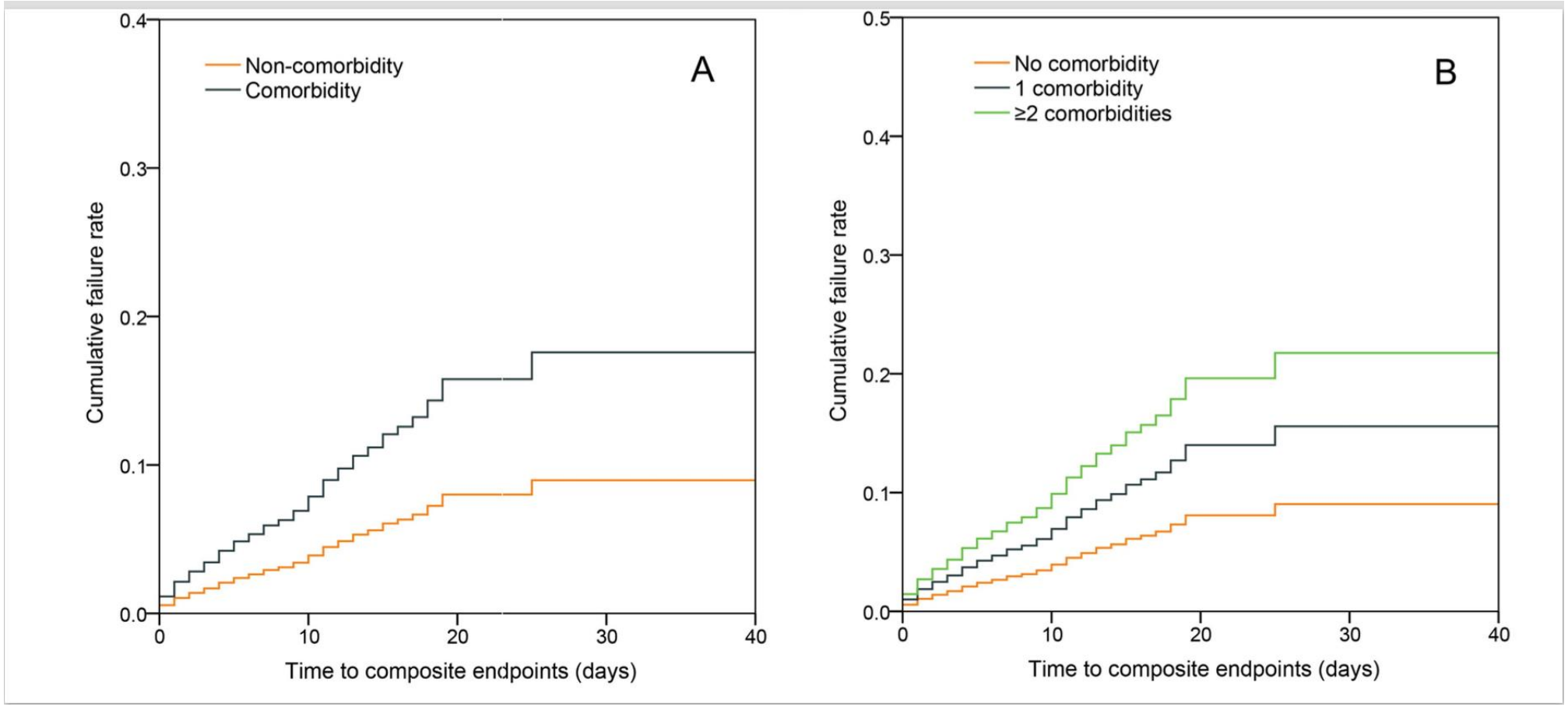
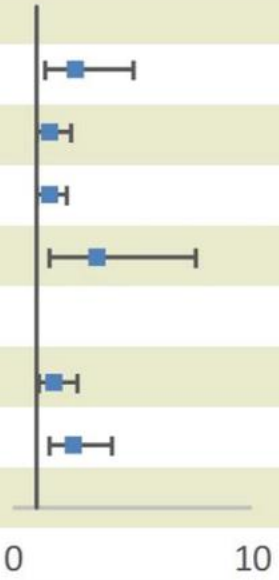


The paper compares a “hazard ratio” of having a chronic illness (comorbidity) compared to those without a chronic condition. It also compares the risk for those with two or more.

Note: the “hazard ratio” is the combined relative risk of being hospitalized, ventilated, or dying.

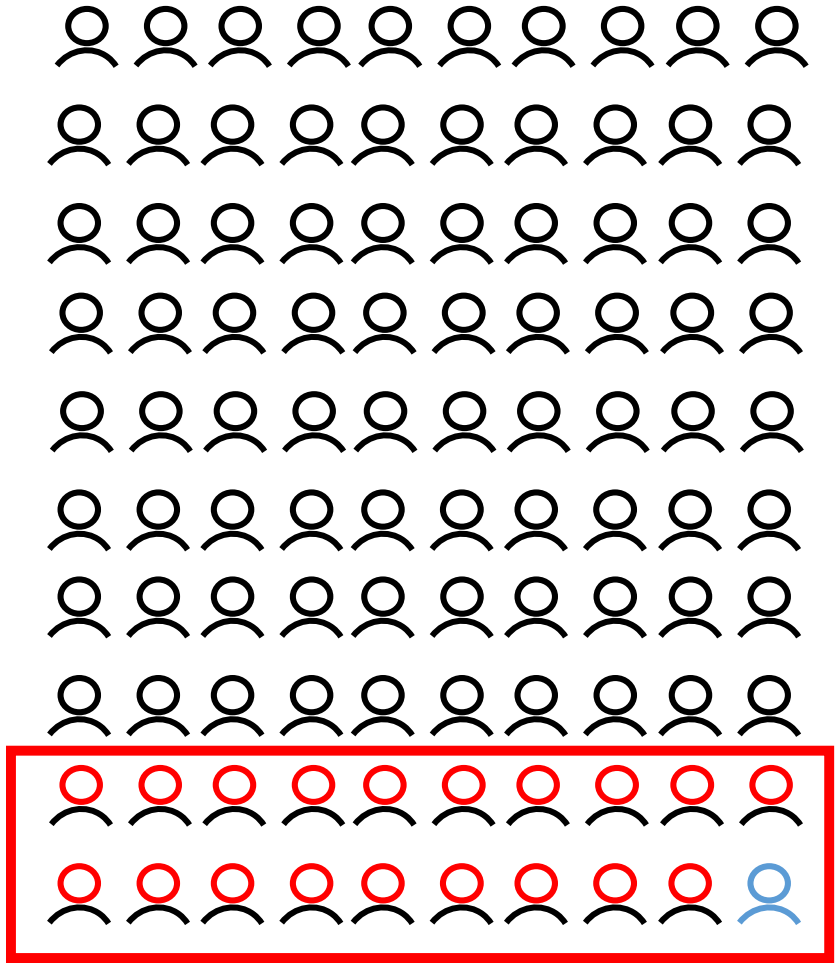
(This is not just the risk of death, which is what the other data sets show.)

Features	Hazard Ratio (95%CI)		P Value
Type of comorbidities			
COPD	2.681	(1.424-5.048)	0.002
Diabetes	1.586	(1.028-2.449)	0.037
Hypertension	1.575	(1.069-2.322)	0.022
Malignant tumor	3.501	(1.604-7.643)	0.002
Number of comorbidities			
1	1.789	(1.155-2.772)	0.009
2 or more	2.592	(1.611-4.171)	<0.001



On average, the hazard ratio for having ONE general chronic illness is 1.79, meaning you're 1.79x more likely compared to your age group to have a severe case.

If you have two or more comorbidities, that means you're 2.59x more likely than others in your age group to have a severe case.



Summary:

- One chronic illness: 1.79x
- Two or more chronic illness: 2.59x

.. more likely than those in your age group to end up needing hospitalization, ventilation, or dying from COVID-19.

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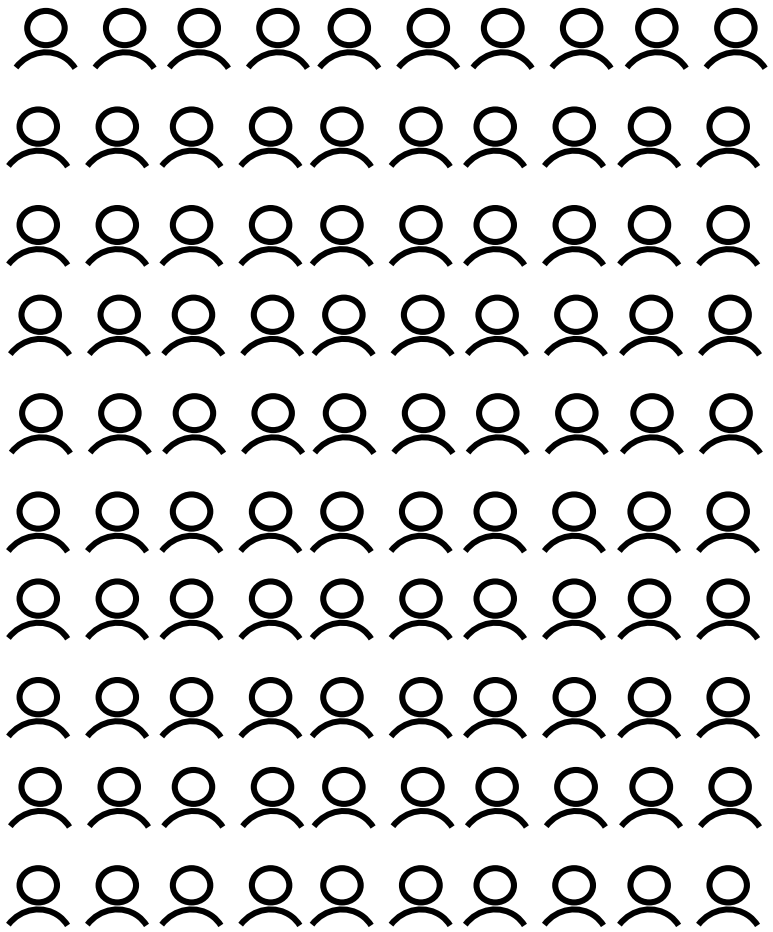
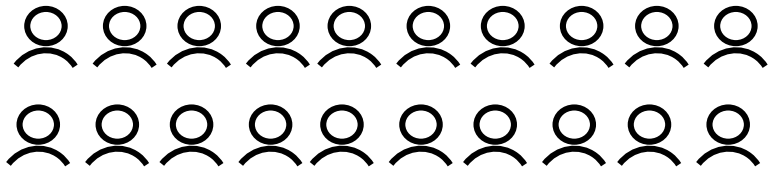
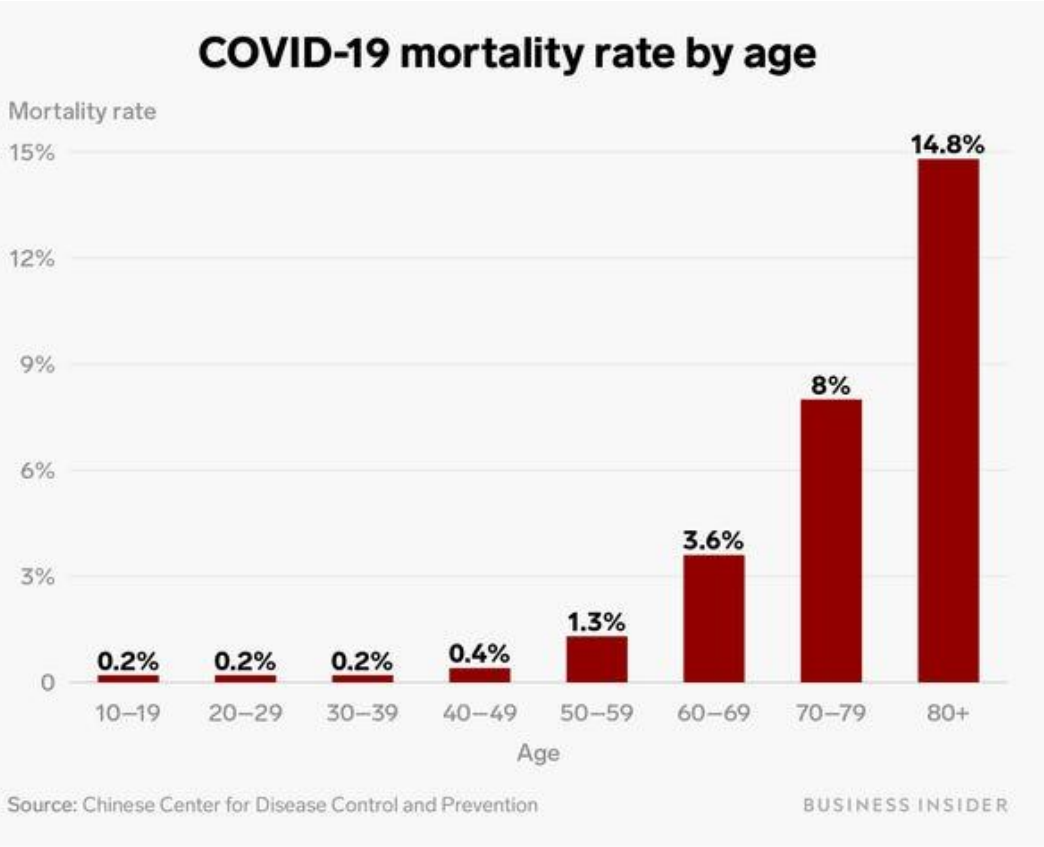


So how do you use this information to assess your risk?

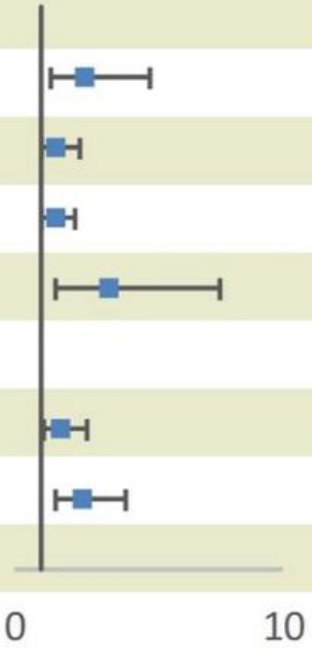




Step 1:

Find your age group.

Features	Hazard
Type of comorbidities	
COPD	2.681
Diabetes	1.586
Hypertension	1.575
Malignant tumor	3.501
Number of comorbidities	
1	1.789
2 or more	2.592



Step 2:

Apply your hazard ratio.

Step 3:

COVID-19 Fatality Rate by COMORBIDITY:

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Hypertension	**8.4%**	**6.0%**
Cancer	**7.6%**	**5.6%**
no pre-existing conditions		**0.9%**

***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.**

Source: worldometers.info March 16, 2020

Compare to the death rate by comorbidity

(that is not broken down by age)

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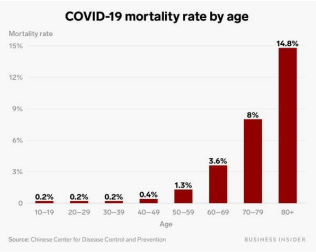
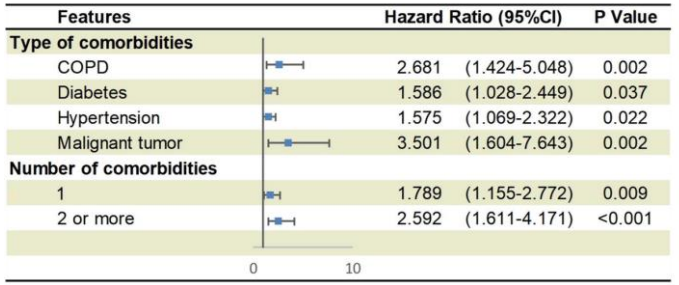
Example 1:

1. 31yo has a 0.2% risk of death from COVID-19, based on age group data



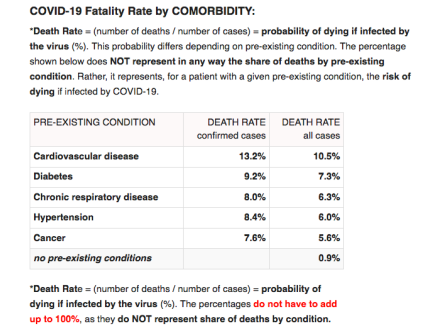
2. With one chronic disease, that 0.2% is multiplied by 1.79x, resulting in 0.36%

   (or by the ratio for the chronic illness of diabetes, which is 1.59x, resulting in 0.32%)



Features	Hazard Ratio (95%CI)	P Value
Type of comorbidities		
COPD	2.681 (1.424-5.048)	0.002
Diabetes	1.586 (1.028-2.449)	0.037
Hypertension	1.575 (1.069-2.322)	0.022
Malignant tumor	3.501 (1.604-7.643)	0.002
Number of comorbidities		
1	1.789 (1.155-2.772)	0.009
2 or more	2.592 (1.611-4.171)	<0.001

3. The risk of death with diabetes, not accounting for age, in COVID-19 is 7.3-9.2%.



COVID-19 Fatality Rate by COMORBIDITY:

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Cardiovascular disease	**13.2%**	**10.5%**
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Cancer	**7.6%**	**5.6%**
no pre-existing conditions		**0.9%**

*__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.**

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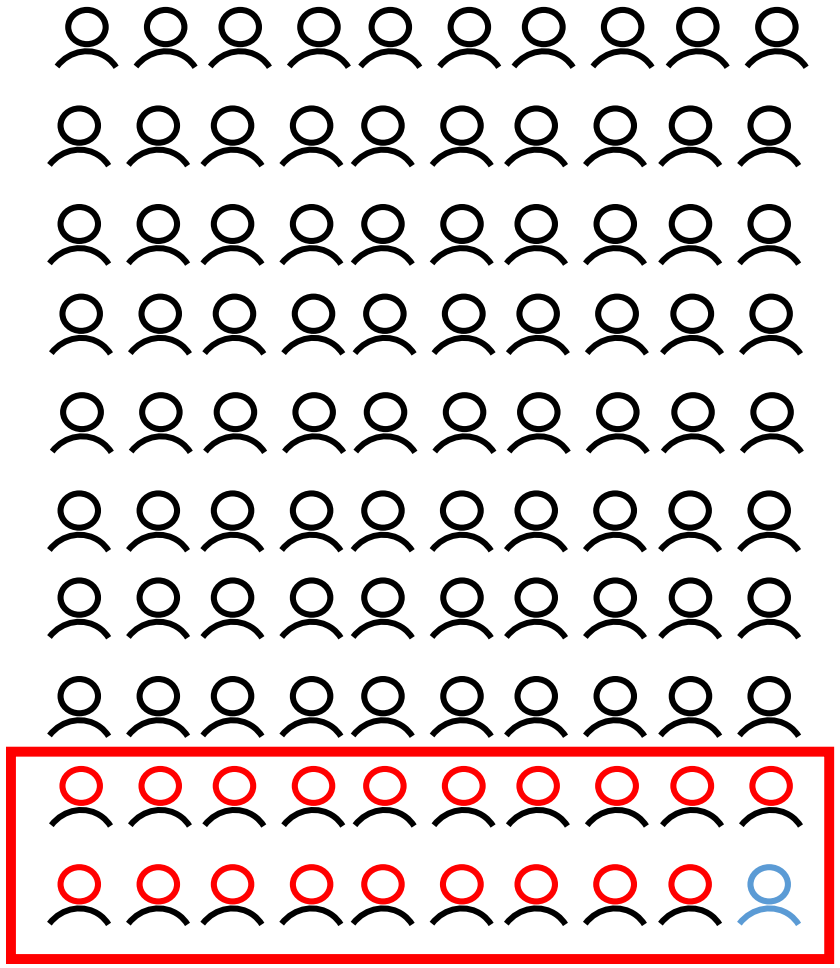
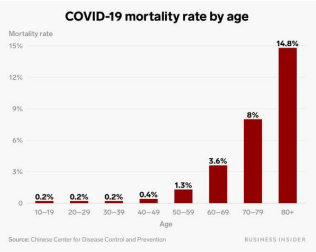


Therefore, while the risk for this individual is increased compared to their age group, their risk is likely not as high as the comorbidity death data suggests, because of their age.

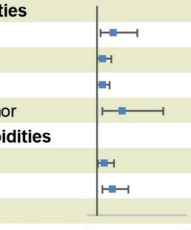
Example 2:

1. 62yo has a 3.6% risk of death from COVID-19, based on age group data.



2. With two chronic diseases, that 3.6% is multiplied by 2.59x, resulting in 9.32%.

Features		Hazard Ratio (95%CI)	P Value
Type of comorbidities			
COPD	2.681	(1.424-5.048)	0.002
Diabetes	1.586	(1.028-2.449)	0.037
Hypertension	1.575	(1.069-2.322)	0.022
Malignant tumor	3.501	(1.604-7.643)	0.002
Number of comorbidities			
1	1.789	(1.155-2.772)	0.009
2 or more	2.592	(1.611-4.171)	<0.001



3. Not accounting for age: the risk of death with diabetes in COVID-19 is 7.3-9.2%; the risk of death with hypertension is 6.0-8.4%.

COVID-19 Fatality Rate by COMORBIDITY:

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Cancer	**7.6%**	**5.6%**
no pre-existing conditions		**0.9%**

*__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.**

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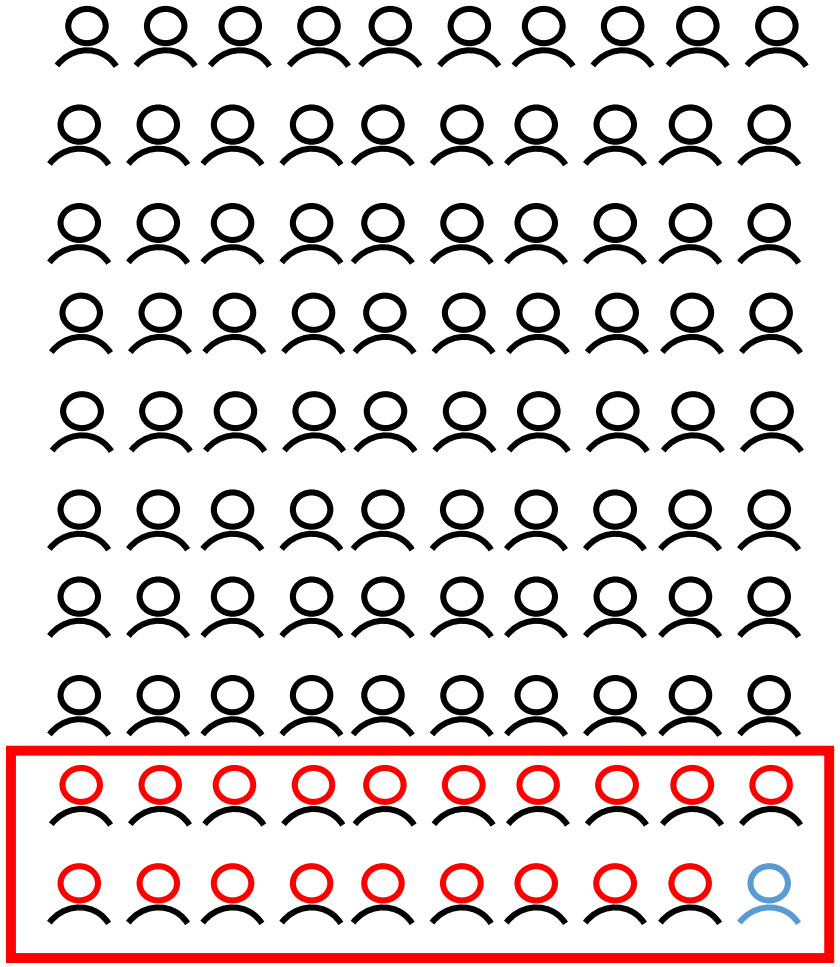
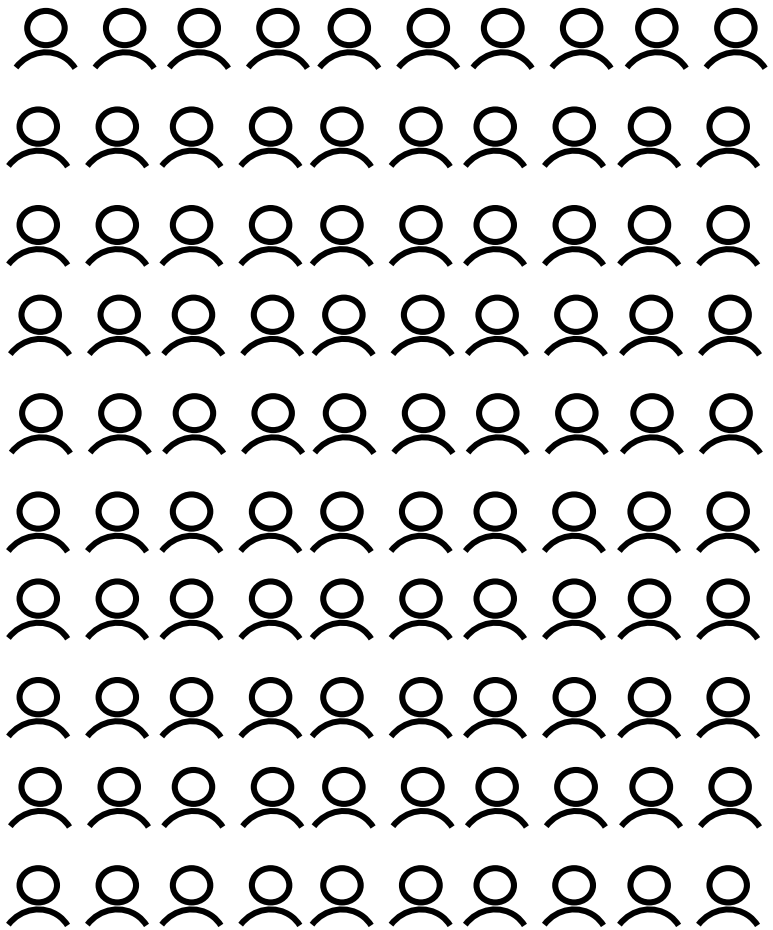
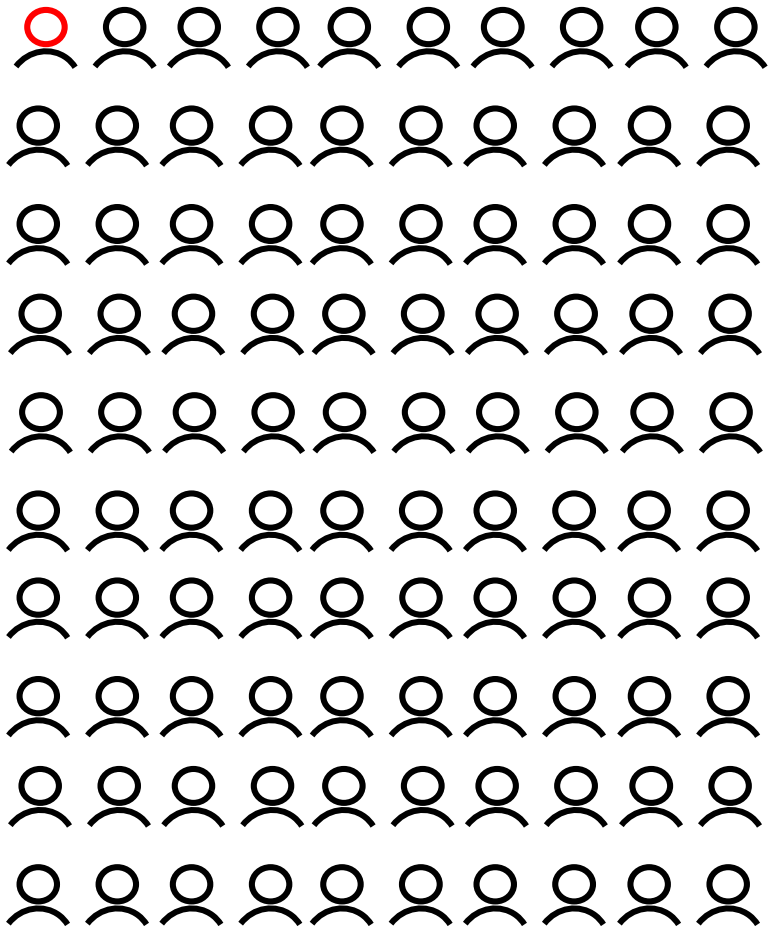


Therefore, the risk for this individual is higher than the average compared to their age group, and their risk of a severe outcome *is* likely as high as the comorbidity death data suggests.



So what should you do if your risk is low?

And what should you do if your risk is high?



STAY HOME

no matter what your risk is.

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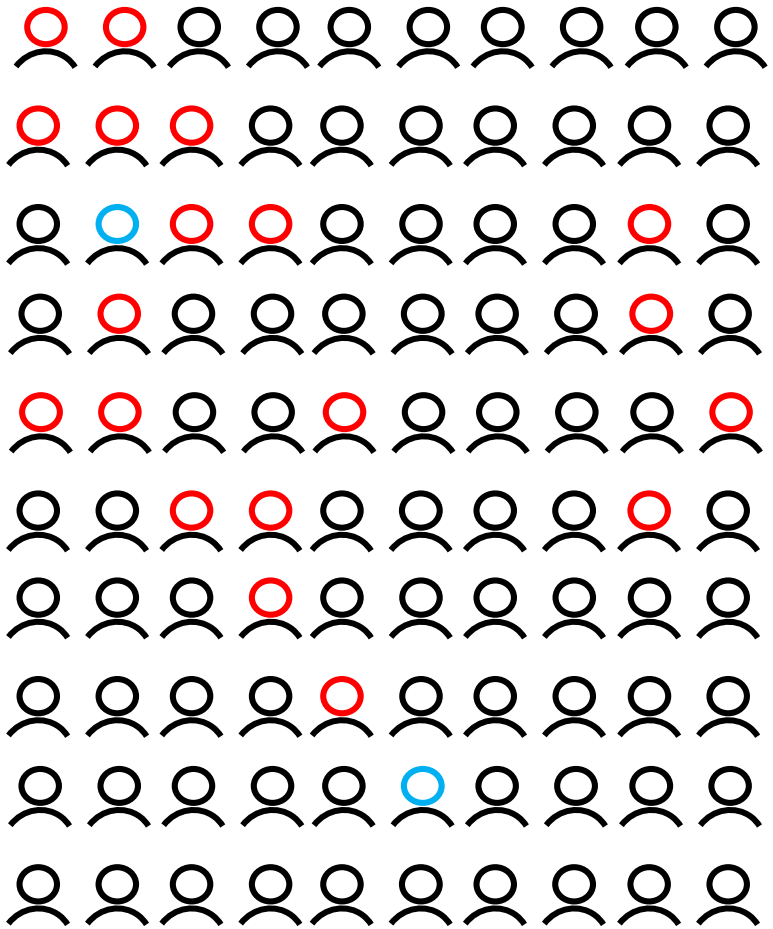

STAY HOME

no matter what your risk is.

Regardless of YOUR risk of *getting* a severe case, if infected you are likely to spread to 2-3 people before you realize you are ill, risking *giving* a case to someone at a much higher risk and risking giving it to someone you love.

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Sources:

- Age data, CDC: https://www.cdc.gov/coronavirus/2019-ncov/index.html
- Comorbidity data, worldometers: worldometers.info accessed March 16, 2020
- Hazard ratio of severe outcomes (hospitalization, ventilation, death) with chronic illness: "Comorbidity and its impact on 1,590 patients with COVID-19 in China: A Nationwide Analysis", doi:10.1101/2020.02.25.20027664, pre-print accessed on March 16, 2020

(These sources generally assume a non-overloaded healthcare system. Rates vary country to country.
The more people stay home, the less COVID-19 spreads and we are less likely to experience worse numbers.)

Common sense disclaimer and reminder:

- Please speak with your doctor about what you should do regarding COVID-19 and have a plan for seeking care if you need help.
- Many cases of COVID-19 can be treated at home, according to the CDC. Seek care if you have trouble breathing, but alert the paramedics or call ahead to the doctor's office or emergency room to let them know you are coming if you have, or suspect you have, COVID-19.

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