



DISCOVERER

Discovery Day | 2020

RESPONSE TO COVID-19

Discovery Health Medical Scheme (DHMS) and Discovery Health have led the market with a comprehensive response to the COVID-19 outbreak in South Africa. Since the first case of COVID-19 was announced in South Africa, DHMS has introduced a number of new benefits, services and initiatives, supported by Discovery Health, for the benefit of members.

As the COVID-19 pandemic progresses, emerging experience from other parts of the world, as well as Discovery data highlights the importance for members to understand and manage their health risks during COVID-19. This has resulted in the expansion of the DHMS response to COVID-19, manifesting in additional benefits for members.



**RESPONSE TO
COVID-19**



**COMPREHENSIVE
BENEFITS AND SUPPORT**



WHITE PAPER
**COUNTING THE
COST OF COVID-19**



WHITE PAPER
**THE COVID-19
RESILIENCE INDEX**

Response to COVID-19



Impact of COVID-19 on Discovery Health administered schemes

SUMMARY CLINICAL INDICATORS

As at 15 May 2020



TESTS CONDUCTED

44 848



CONFIRMED CASES

1 539



MEMBERS ADMITTED

389

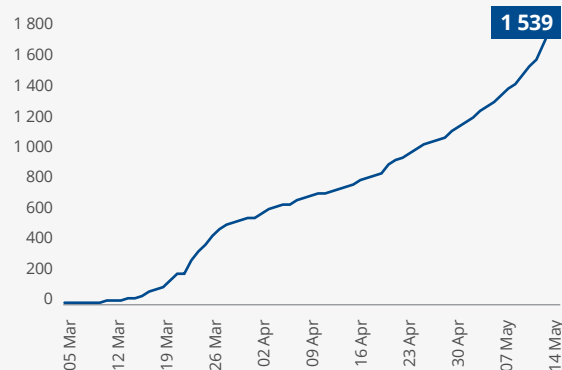


DEATHS

37

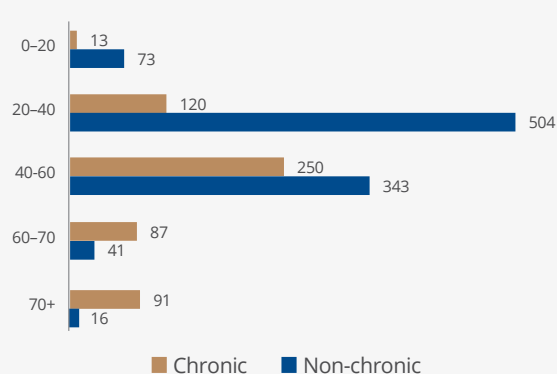
COVID-19 CONFIRMED CASES

12% of confirmed cases in South Africa are under Discovery Health administration



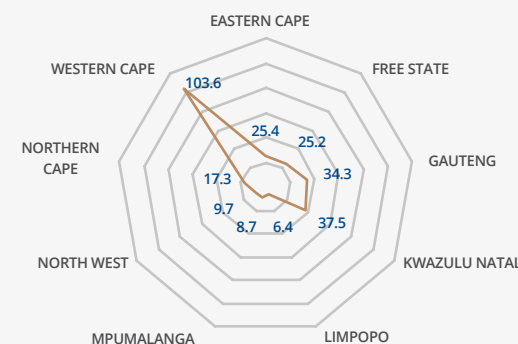
CONFIRMED CASES BY AGE AND CHRONICITY

36% of confirmed cases are chronic members
Median age is 41 years



PREVALENCE BY PROVINCE

Western Cape is a clear outlier
Case prevalence per 100 000 DH lives



ADMISSION TRENDS

TOTAL ADMISSIONS	NUMBER	AVERAGE COST PER EVENT
	458	R84 708

ICU ADMISSIONS	NUMBER	AVERAGE COST PER EVENT
	78	R169 525

VENTILATOR ADMISSIONS	NUMBER	AVERAGE COST PER EVENT
	35	R340 737

Collective response to COVID-19

Discovery Health and Discovery Health Medical Scheme have developed a comprehensive combined response to the COVID-19 outbreak, drawing on the resources, capacity and assets of both entities to assist members and healthcare professionals, and extend support to all South Africans during the outbreak.



MARKET LEADING RESPONSE TO COVID-19

Discovery Health Medical Scheme (DHMS) led the market with its comprehensive response to the COVID-19 outbreak in South Africa. Since the first case of COVID-19 was announced, DHMS has introduced a number of new benefits, services and initiatives for the benefit of members.

These include:

- The WHO Global Outbreak Benefit, to cover testing and treatment of members diagnosed with COVID-19
- Funding for self-isolation in managed isolation hotels
- Contribution relief for SMEs and individuals



EXPANDING THE RESPONSE TO COVID-19

The South African Government imposed interventions early on to contain the initial spread of COVID-19, and 'flatten the curve' of the outbreak. These actions have allowed South Africa to prepare for the spread of COVID-19.

Emerging experience from other parts of the world, as well as Discovery data, highlight:

- The importance of regular risk assessment, screening and appropriate testing for all members
- The importance for members to understand and manage their health risks

These two items have informed the expansion of the DHMS response to COVID-19, manifesting in additional benefits and services for risk assessment, screening and testing.

Comprehensive benefits and support

- FINANCIAL SUPPORT
- ACCESS TO SCREENING AND TESTING
- ACCESS TO VIRTUAL CONSULTATIONS
- ACCESS TO ISOLATION FACILITIES
- SUPPORT FOR AT-RISK MEMBERS
- SUPPORT FOR EMPLOYERS



Providing financial support

The South African government has taken unprecedented steps to curb the spread of COVID-19, with President Ramaphosa declaring a National State of Disaster on 15 March, and a national lock-down from 26 March impacting all non-essential businesses. Unfortunately, such measures will have a material effect on many businesses and their employees, with the country's economy expected to contract by 6.1% in 2020.



Various initiatives have been put in place to assist businesses and their employees during these challenging times, including setting up a Solidarity Fund to combat the spread of the virus, a Temporary Employee Relief Scheme to assist with wage payments where the employer is unable to pay the full salaries of their employees and a SMME relief fund to offer financing for working capital for businesses that register with the Small Business Development department. The South African Revenue Service has also announced several proposals to assist 4 million workers through a tax subsidy and approximately 75 000 small and medium enterprises (SME) by delaying a portion of their tax payments.

The following concessions have been created to assist in addressing the impact of the economic downturn on members and employers during the COVID-19 outbreak.



Funding medical scheme contributions from Medical Savings Account (MSA)



Contribution concession for SME businesses with employees on the medical scheme



Premium concession for SME businesses with employees covered by health insurance products

MEMBERS WITH POSITIVE MSA BALANCES

To assist members, Discovery Health Medical Scheme (DHMS) has allowed members with a MSA to **use their positive balance to pay their total medical scheme contribution** for up to three months. Positive MSA refers to the 'cash' balance and does not include the upfront balance allocated to the member at the start of each calendar year.

Individuals may apply to access the option where they have a positive MSA balance equivalent to at least one month's medical scheme contributions. The total contribution will be funded from the MSA balance, with the member's MSA balance adjusted accordingly. Members may not elect for partial funding from their MSA balance.

Members taking up this offer might experience out of pocket health claims during the benefit year as a result of a depleted MSA, but will not have any suspension imposed on their membership for the period that the contribution is funded from their MSA.

Discovery Health has communicated with qualifying members providing them with a link to activate the benefit and select the number of months of funding.

SME BUSINESSES

To assist small and medium-sized enterprises, DHMS has offered qualifying employers a concession to defer up to two-months of medical scheme contributions of their employees. These contributions would need to be repaid over a period of up to 12-months after the deferment period. No interest will be charged on the contributions deferred. The concession will be effective immediately.



ELIGIBILITY CRITERIA:

- 01 | Proactively request a contribution concession;
- 02 | Employ between 10 and 200 employees;
- 03 | Be an employer on DHMS in good standing.

Interested employers should complete an online application and accept the terms and conditions. Discovery Health will conduct a financial review of the credit risk of offering the concession to the employer before making a decision and informing the employer of the outcome. Should the employer not comply with the repayment arrangement, the Scheme reserves the right to apply the usual credit control processes and policies which could include suspension and/or withdrawal of their employees' membership.

The application form is available on the Financial Adviser Zone on www.discovery.co.za >COVID-19 Business Support > Health.

Employer groups will need to complete the application form, confirming they meet the eligibility criteria, selecting the deferment and repayment periods and agreeing to the Terms and Conditions.



SME BUSINESSES

To assist small and medium-sized enterprises, Discovery has offered qualifying employers a concession to defer up to two-months of Primary Care premiums of their employees. These premiums would need to be repaid over a period of up to 12-months after the deferment period. No interest will be charged on the premiums deferred. The concession will be effective immediately.



ELIGIBILITY CRITERIA:

- 01 | Proactively request a premium concession;
- 02 | Employ between 10 and 200 employees;
- 03 | Be an employer on Discovery Primary Care in good standing.

Interested employers should complete an online application and accept the terms and conditions. Discovery will conduct a financial review of the credit risk of offering the concession to the employer before making a decision and informing the employer. Should the employer not comply with the repayment arrangement, Discovery reserves the right to apply the standard credit control processes and policies which could include suspension and/or withdrawal of their employees' policies.

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Employer groups will need to complete the application form, confirming they meet the eligibility criteria, selecting the deferment and repayment periods and agreeing to the Terms and Conditions.

Enhanced benefits for screening and testing

DHMS has enhanced its benefits for screening and testing to ensure that members can consult with a doctor if they are at risk of COVID-19, and that the necessary screening and tests for COVID-19 are covered, regardless of the outcome. We have also created an accessible COVID-19 risk assessment tool for members.



RISK ASSESSMENT

Members can understand their risk status at any point in time by completing the **COVID-19 risk assessment** available via the Discovery app, www.discovery.co.za or by calling Discovery.

The assessment is a set of questions which determines if a member could be at risk and needs a consultation with a doctor.

Future updates will include the ability to see the results of the assessment indicating a member's risk index relative to the DHMS membership base. Members will also be able to access and download their full risk assessment history.



SCREENING

The **WHO Global Outbreak Benefit** covers COVID-19 screening consultations, where the member has completed the risk assessment. Members can choose to either access a virtual or face-to-face consultation at a network provider.

Virtual consultations provide a safe alternative to face-to-face consultations for patients and doctors, and contributes to the important containment measures that will reduce the impact of the outbreak. Since the start of the COVID-19 outbreak, over 6 500 DHMS members have consulted virtually with their doctor.



TESTING

Members have access to **COVID-19 PCR testing** funded in full from the WHO Global Outbreak Benefit, regardless of the outcome of the test when referred by the doctor or nurse that screened the patient. PCR testing is limited to two tests per beneficiary per annum. In addition, members that require a hospital admission have access to a COVID-19 PCR test funded in full.

To support healthcare professionals who are operating on the front-line during the COVID-19 outbreak, the benefit includes four PCR tests for registered healthcare professionals that are members of DHMS.

Online doctor consultations to fight COVID-19, available for free to all South Africans

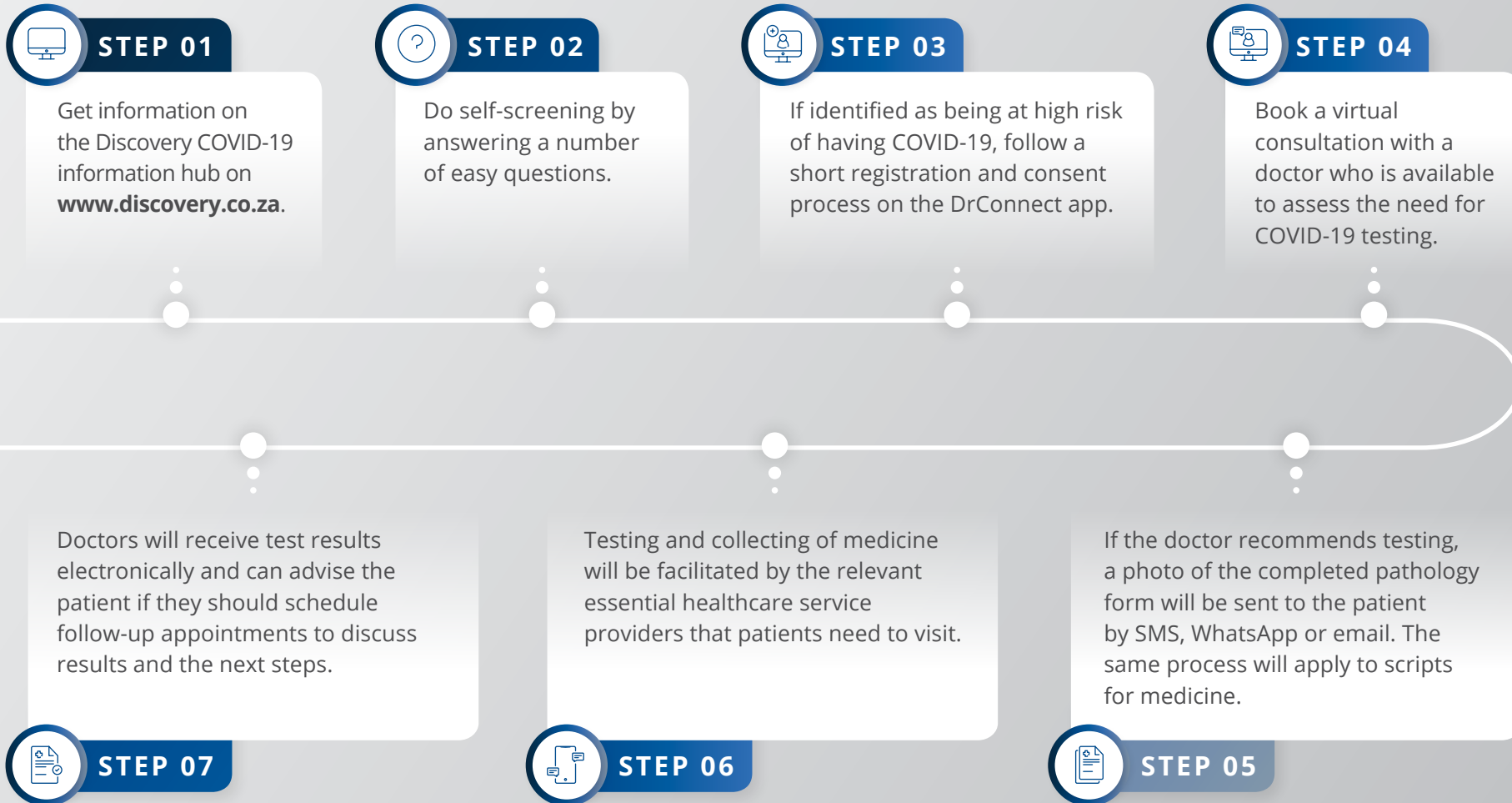
Globally, telemedicine has proved invaluable in the management of this disease, with many governments and healthcare systems advocating virtual consultations first, as a primary means of healthcare consultations required during the COVID-19 outbreak. Virtual healthcare tools can help to identify people who need referral to hospital, reduce overcrowding at clinics and doctors' rooms where there is greater risk of the virus spreading and also protect healthcare professionals from potential repeated exposure to COVID-19.



In close collaboration with the National Department of Health, Discovery and Vodacom have partnered to deliver a free virtual healthcare platform for the benefit of all South Africans during the COVID-19 pandemic. This platform provides easy access for all South Africans to immediate healthcare professional consultation and advice, and also serves to protect doctors from repeated personal exposure to COVID-19 through deploying leading virtual technology.

As part of this partnership, the two companies have jointly created a **COVID-19 Healthcare Fund** to pay doctors with the first 100 000 consultations free to any South African. For members of schemes administered by Discovery Health, these COVID-19 Online Doctor Consultations will be paid from their medical scheme's risk benefits, where applicable. Where these benefits are not available, these COVID-19 Online Doctor Consultations will be covered by the COVID-19 Healthcare Fund.

INDIVIDUALS CAN ENGAGE IN THE FOLLOWING TAILORED DIGITAL JOURNEY TO BETTER UNDERSTAND THE RISKS OF CONTRACTING COVID-19 AND TO CONSULT VIRTUALLY WITH A DOCTOR:



Isolating at specifically managed hotels to protect family members

The majority of people who are diagnosed with COVID-19 experience mild illness and are able to recover at home without intensive medical care. As far as possible such individuals should isolate themselves from others in their home. When they cough, exhale or sneeze, they release droplets of fluid containing virus particles into the air, putting their family members at-risk of also contracting the disease.



To assist members of DHMS who have been diagnosed with or awaiting test results for COVID-19 to isolate themselves from their families, Discovery Health has partnered with reputable hotels to create specifically managed isolation hotels starting with the Capital Hotels in Johannesburg and to be expanded to Cape Town, Durban and Pretoria with various other partners. Members of DHMS can check into these hotels as an alternative to home-based isolation, and will have access to medical support during their stay, including nurse care with daily monitoring of vital signs, supportive over-the-counter medicine and referral for online virtual consultations.

The cost to the member starts at R950 per person per night. This is approximately a 60% reduction on the room rates, with the Scheme negotiating preferential rates. The daily rate includes three meals, cleaning services and nursing assistance. Virtual doctor consultations and medicine will be funded from the member's day-to-day benefits where available.

Support for members who are at-risk of developing COVID-19 complications

Discovery Health Medical Scheme has enhanced its benefits for all members to ensure that they can understand their risks of developing complications related to COVID-19, can manage these health risks, and can reduce the risk of complications if they are diagnosed with COVID-19.



APPROPRIATE RISK STRATIFICATION

For members who complete a health check with one or more high risk health indicators, DHMS will provide funding for a virtual consultation with a healthcare professional to confirm the risk, make appropriate diagnoses, and prescribe the necessary treatment.

Members on all plans get access to one virtual GP consultation, or nurse consultation at network pharmacy clinic with virtual GP capability per annum.



PROACTIVE ENGAGEMENT WITH AT-RISK MEMBERS

Individuals who may be at risk of developing COVID-19 related complications including critical hospital care, ICU and ventilation may decide to avoid accessing necessary healthcare due to the fear of contracting the virus.

To support these members, DHMS will pro-actively identify these individuals and fund a telephonic consultation with a wellness specialist. The consultation will assess the members' current state of physical and mental wellbeing and make the members aware of the risk of COVID-19 to their health. The wellness specialist will also assist the member in accessing necessary healthcare services including medicine delivery and virtual healthcare.

At-risk members on all plans get access to one wellness specialist consultation per annum.



HOME MONITORING FOR AT-RISK COVID-19 POSITIVE MEMBERS

Emerging evidence from the COVID-19 outbreaks in Europe and the US shows that at-risk patients with COVID-19 may suffer 'silent hypoxia', i.e. oxygen deprivation without showing any symptoms. Much of the multi-organ damage reported in these cases may well be linked to the extended period of hypoxia. For these patients, monitoring oxygen saturation with earlier intervention may prevent severe complications in their health.

DHMS will fund a pulse oximeter for qualifying members when obtained from a network provider, up to 3 consultations with a nurse to track and monitor oxygen-saturation levels, and appropriate referral to a GP where necessary.

Supporting employers with the COVID-19 Business Support Service

The COVID-19 pandemic is impacting society on many levels, and businesses both large and small are required to manage an unprecedented operating environment. In particular, executives and their management teams are expected to not only deal with the personal impact of COVID-19, but also the profound impact on their business and their people.

Discovery Health has developed a comprehensive set of COVID-19 support services to assist employers and their management teams in formulating and executing an effective response to COVID-19 as their employees return to work, given the importance of protecting their employees, and ensuring the continuity of their operations. These services include:

- **COVID-19 resource hub and 24/7 hotline**
- **Identification and management of at-risk employees**
- **COVID-19 employee screening and health checks**
- **COVID-19 case management**
- **COVID-19 contact tracing in the workplace**

All these benefits will be facilitated by a team of qualified healthcare professionals. For employees that are members of DHMS, the cost of these services are covered by the Scheme.





COVID-19 RESOURCE HUB AND 24/7 HOTLINE

A large-scale awareness campaign is underway to provide members and employers with the latest information and guidance on how to prevent and contain potential infection. **The COVID-19 information hub is located on the Discovery website and dedicated to providing the latest news, updates and information available.** Employers also have access to a dedicated 24/7 COVID-19 hotline, with a team of healthcare professionals available to empower employers with the latest information and guidance relating to COVID-19, as well as telephonic screening, triage, risk classification and onward referrals for suspected cases.



IDENTIFICATION AND MANAGEMENT OF AT-RISK EMPLOYEES

Employers have access to insights into the overall health and wellness of their employees through the Employee Intelligence dashboard on the Employer Zone. These insights include the chronic disease prevalence amongst employees highlighting any employees who are at-risk of developing complications if they contract COVID-19.

Discovery Health has developed the ability for employers to request an email to be sent to high-risk employees on their behalf outlining the preventive measures these employees should take. As further support, employers are able to directly email their management teams informing them of this process.



HEALTH CHECKS AND COVID-19 SCREENING

According to the World Health Organization, in more than 80% of all reported cases, fever is the most typical symptom. As employees start returning to work, temperature checks will play a vital role in identifying the COVID-19 virus.

Discovery Health can provide wellness services for employees at the request of the employer. These services may include temperature checks, COVID-19 risk assessments and wellness checks.



CASE MANAGEMENT

In the event of a suspected case, employees will be referred by the employer to the COVID-19 hotline where a comprehensive screening and triage process will be performed. In the event of a positive COVID-19 case, Discovery Health will provide access to clinical advice, facilitation of testing and ongoing support to employee and employer.



CONTACT TRACING

As employees start returning to work, contact tracing will be an effective tool for controlling the chain of transmission for COVID-19. Discovery Health is able to facilitate this process for employers to understand the extent of the exposure in the workplace.



Counting the cost of COVID-19

INITIAL PROJECTIONS OF THE POTENTIAL
FINANCIAL IMPACT OF THE VIRUS ACROSS
THE MEDICAL SCHEME INDUSTRY





This paper provides insights on the South African COVID-19 outbreak analysing the experience of members on medical schemes administered by Discovery Health, while examining the effect of screening, testing and hospital costs related to COVID-19 on the medical scheme industry.

- Discovery Health, the administrator and managed care provider to 19 medical schemes with 3.5 million lives under administration, is in a unique position to offer insights on COVID-19.

Discovery's initial experience highlights that older members with known health problems are most at risk of complications due to COVID-19, that the severity of COVID-19 cases becomes worse with age, that the hospital admission costs related to COVID-19 vary significantly by type of hospital admission with cases that require ventilators costing, on average, over R340 000, and that the proportion of cases that result in death increases significantly from age 70.

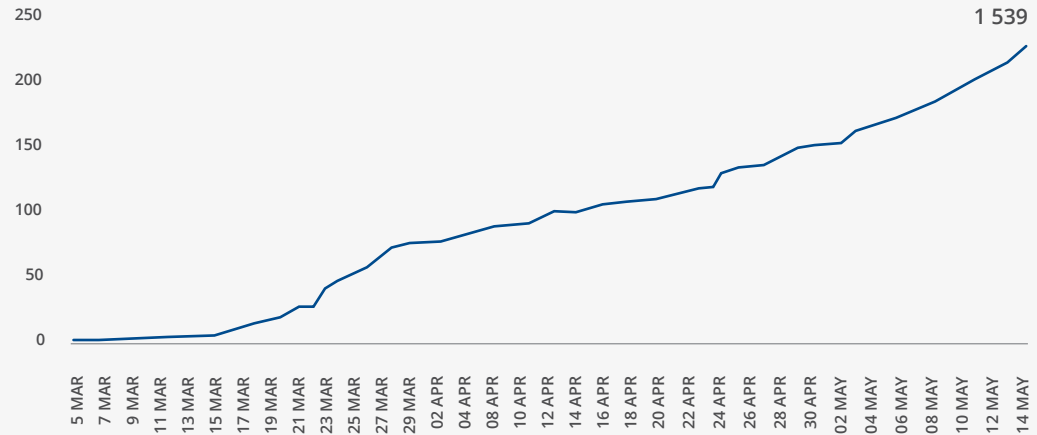
- Medical schemes are expected to incur additional claims of between R7.3bn and R31.8bn related to COVID-19 during the pandemic. The majority of these additional costs will be due to COVID-19 screening and testing, and hospital admissions related to COVID-19. The impact of the cost will vary among medical schemes – schemes with an older membership base, and lower levels of reserves per beneficiary are likely to be relatively worse off compared to others as a result of COVID-19.
- The impact of COVID-19 on the financial position of medical schemes over the next couple of years is uncertain, and will depend on factors such as the severity of the pandemic in South Africa and the extent of claims for discretionary and elective healthcare episodes during this period. That being said, medical schemes are expected to generate a surplus of contributions over claims in 2020, given the decrease in elective hospital admissions in the first half of 2020, without a commensurate increase in COVID-19 claim costs. Medical schemes are also expected to need this surplus to cover potential significant COVID-19 related costs during 2021.

DISCOVERY'S EXPERIENCE RELATING TO COVID-19

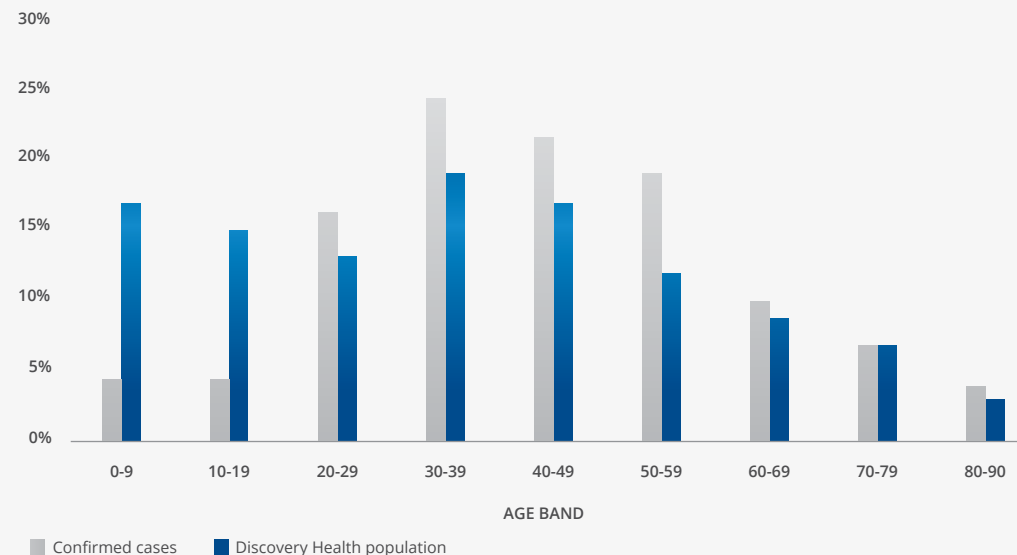
DISCOVERY HAS UNIQUE INSIGHTS INTO THE COVID-19 RELATED EXPERIENCE ON THE MEDICAL SCHEME POPULATION

- As of 15 May 2020, there were **1 539 confirmed COVID-19 cases** of members on medical schemes administered by Discovery Health.
 - Of the 1 539 cases, the vast **majority are based in the Western Cape and Gauteng** with 41% and 38% of the cases respectively.
 - Across South Africa, the Western Cape and Gauteng also hold the top spots for the most number of cases, however the Western Cape makes up the majority with 58% and Gauteng accounts for 16% of the COVID-19 cases.¹
 - 36%** of the positive cases have at least one **chronic condition**.
- The age distribution of confirmed cases is **biased to the middle age bands** when compared to the general Discovery Health population.
 - The median age of members with a confirmed diagnosis is **41 years**.
 - The **proportion of confirmed cases** among members aged **older than 60 years is similar to the Discovery Health population**.
 - The proportion of confirmed cases at younger ages is significantly lower than the Discovery Health population.
 - 16% of members, belonging to medical schemes administered by Discovery Health, **are less than 10 years old** however only 3% of confirmed cases fall into this age band. A similar view can be seen for members aged 10 – 19 years old.
 - This experience is consistent with findings globally. South Korea, as an example, has reported that 7% of their confirmed COVID-19 cases were less than 20 years old.²

CONFIRMED COVID-19 CASES OF MEMBERS ON MEDICAL SCHEMES ADMINISTERED BY DISCOVERY HEALTH



AGE DISTRIBUTION OF CONFIRMED CASES VS DISCOVERY HEALTH POPULATION



¹ National Institute for Communicable Diseases: <https://www.nicd.ac.za/diseases-a-z-index/covid-19/>

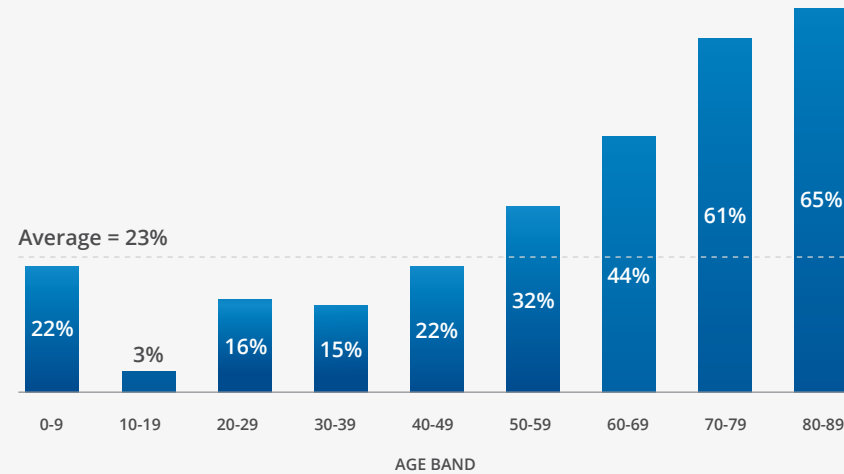
² Age distribution of COVID-19 cases in South Korea as of 15 May, 2020; Statista 202

DISCOVERY'S EXPERIENCE RELATING TO COVID-19

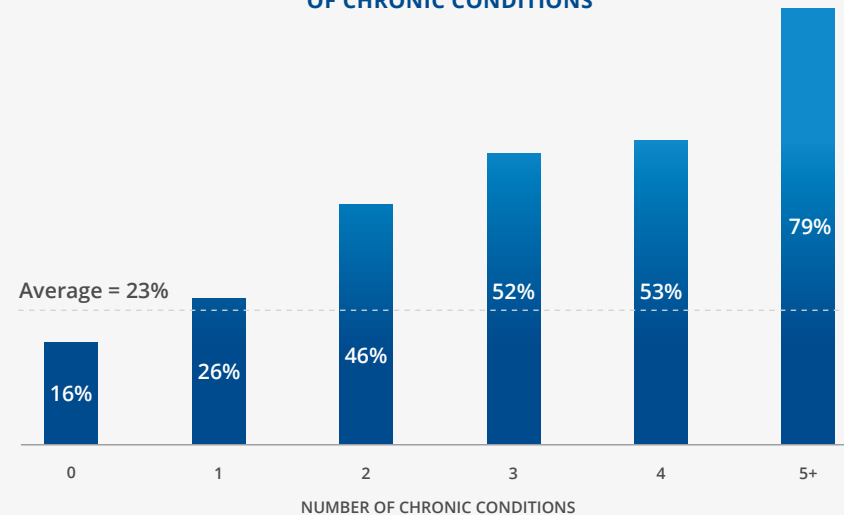
OLDER MEMBERS WITH KNOWN HEALTH PROBLEMS ARE MOST AT RISK OF COMPLICATIONS DUE TO COVID-19

- Although the age distribution of confirmed cases is biased to the middle age bands when compared to the general Discovery Health population, the age distribution of cases requiring hospital treatment is biased to older ages.
- Across all medical schemes administered by Discovery Health, **approximately 23% of confirmed COVID-19 cases** have been **admitted into hospital**.
- The hospital admission rate increases with age (with the exception of confirmed cases under the age of 10).
 - The median age of confirmed cases that required hospital treatment is 52 years. This is higher than the median age of all confirmed cases.
 - 65% of positive COVID-19 cases in the highest age band of 80 – 90 years old have been admitted to hospital.
 - Various international studies have shown similar results, with higher admission rates among older patients.
- The **admission rate** has also been seen to **increase with the number of chronic conditions** a member has.
 - One in six members who have COVID-19 and have no chronic conditions are admitted to hospital.
 - Approximately half of members with between two and four chronic conditions who have COVID-19 are admitted to hospital.
 - The admission rate is significantly higher, at **79%**, for members who have **at least five chronic conditions**.
 - This corresponds with results from a study conducted in New York City, which found that 88% of patients hospitalised with COVID-19 had at least 2 chronic conditions.⁴

PROPORTION OF CONFIRMED CASES ADMITTED TO HOSPITAL BY AGE BAND



PROPORTION OF CONFIRMED CASES ADMITTED TO HOSPITAL BY NUMBER OF CHRONIC CONDITIONS



³ Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020; Centers for Disease Control and Prevention

⁴ Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area: Richardson, Hirsch, Narasimhan, et al, Journal of American Medical Association

DISCOVERY'S EXPERIENCE RELATING TO COVID-19

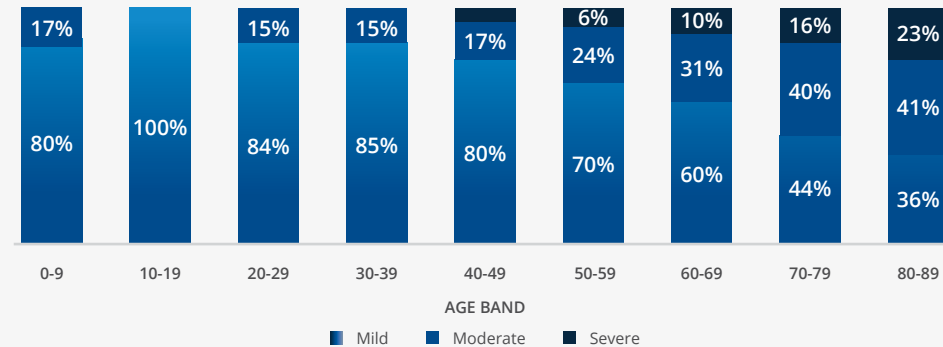
THE SEVERITY OF COVID-19 CASES BECOMES WORSE WITH AGE

- The symptoms that members with COVID-19 present with can be considered as **Mild** (confirmed cases not admitted into hospital), **Moderate** (confirmed cases admitted to hospital but not ICU), or **Severe** (confirmed cases admitted to ICU).
 - To date, 77% of confirmed cases for Discovery Health were Mild, and required no admission.
 - Of the 23% that required treatment in hospital, 4% of cases required admission to ICU.
- The risk of developing **complications** that require treatment in hospital **increase with age**.
 - The vast majority of members with COVID-19 below age 50 recover without the need for treatment in hospital.
 - At older ages, members are at greater risk of complications. **For members aged 60 and above, 37% of cases are considered moderate and 15% are considered severe.**
 - Studies conducted in China have shown that overall, 81% of COVID-19 cases were deemed to be mild, 14% considered severe and 5% of cases were considered critical.^{5,6} This is in-line with the Discovery Health experience where 75% of cases are considered mild, 20% moderate and 3% severe.
- The hospital admission costs related to COVID-19 vary significantly by type of hospital admission.
 - The **average cost** of all COVID-19 hospital admissions is **R84 708**.
 - Hospital admissions which require **ventilators**, accounting for 7% of hospital admissions, cost on average **R340 737**.
 - ICU admissions**, which account for 7% of hospital admissions, have the **largest variation in cost** with an average of R169 525.

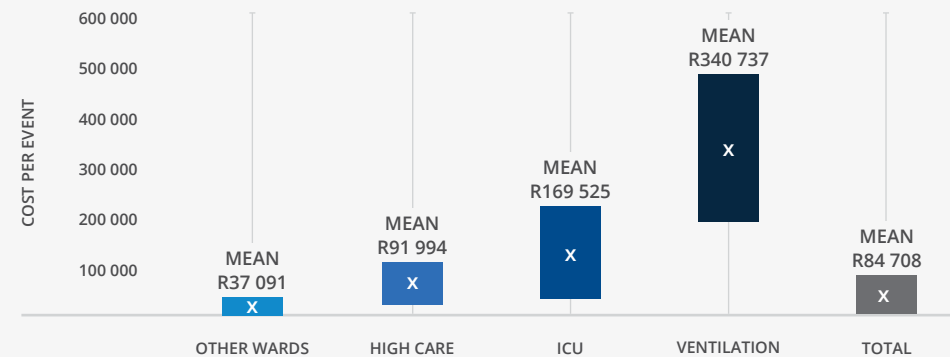
⁵ Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. JAMA. 2020;323:1239;

⁶ Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. [The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China] [in Chinese]. Zhonghua Liu Xing Bing Xue Za Zhi. 2020;41:145-51

CONFIRMED COVID-19 CASES BY AGE AND SEVERITY



DISTRIBUTION OF HOSPITAL COSTS BY ADMISSION TYPE



	OTHER WARDS	HIGH CARE	ICU	VENTILATION	TOTAL
NO OF COMPLETED ADMISSIONS	143	69	17	19	248
% OF HOSPITAL ADMISSIONS	58%	28%	7%	7%	100%
% OF CONFIRMED CASES¹	9.3%	4.5%	1.1%	1.2%	16.1%

¹ Percentages are understated as active cases may result still result in a hospital admission

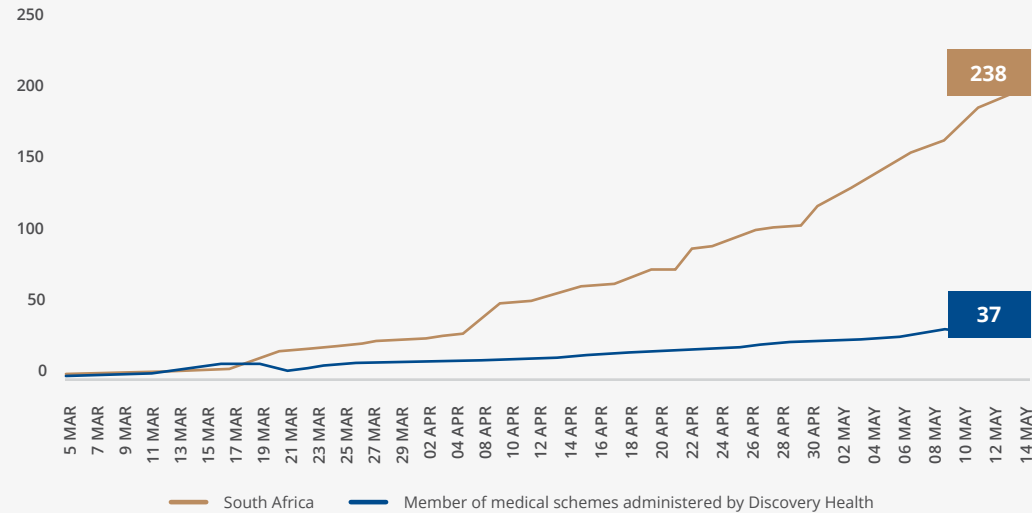
DISCOVERY'S EXPERIENCE RELATING TO COVID-19

THE PROPORTION OF CASES THAT RESULT IN DEATH INCREASES SIGNIFICANTLY FROM AGE 70

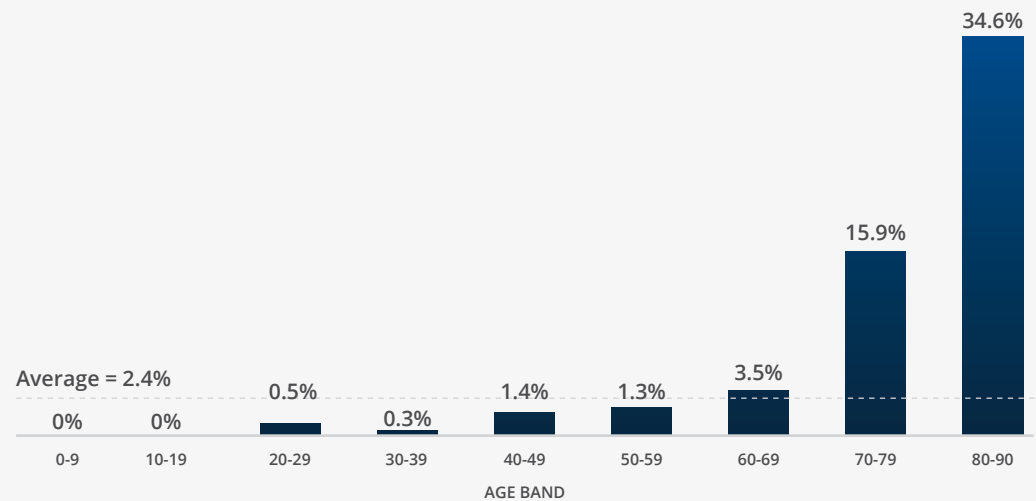
- Medical schemes administered by Discovery Health have experienced **37 fatalities** as a result of COVID-19.
 - This amounts to **16% of deaths** experienced **across South Africa**.
 - Along with increasing severity by age, **more fatalities occur in older ages**.
 - A significant **increase in the case fatality rate** is experienced from **ages 70 and above**.
- An average case fatality rate across Discovery Health has been calculated to be 2.4%, slightly higher than the case fatality rate of 1.8% calculated for South Africa.
 - The case fatality rates (number of deaths as a proportion of the number of confirmed cases) differ materially by country. Reasons include differences in the demographics of the country (mortality tends to be higher in older populations) and the characteristics of the healthcare system (e.g. mortality may rise as hospitals become overwhelmed and have fewer resources), as well as differences in the number of people tested including whether individuals with milder cases are tested (impacting the denominator), and the approach to report deaths (impacting the numerator).
 - Currently, Italy has the highest case fatality rate at 14.1% compared to 6.8% for the world.
 - South Korea has a case fatality rate of 2.7%, in line with the current experience across Discovery Health.⁷

⁷ Our World in Data, 16 May 2020; <https://ourworldindata.org/mortality-risk-covid>

TOTAL FATALITIES



CASE FATALITY RATE BY AGE BAND



PROJECTED COVID-19 RELATED EXPENSES ACROSS THE MEDICAL SCHEME INDUSTRY

MEDICAL SCHEMES ARE PROJECTED TO POTENTIALLY INCUR ADDITIONAL CLAIMS OF BETWEEN R7.3BN AND R31.8BN RELATED TO COVID-19 DURING THE PANDEMIC

- Using the COVID-19 experience of members on medical schemes administered by Discovery Health as well as the projections of the COVID-19 infections and fatalities across South Africa, one can project potential costs which may be incurred by medical schemes for the rest of 2020 and the first six months of 2021.

01 | COVID-19 SCREENING AND TESTING

- In May 2020, the Prescribed Minimum Benefit (PMB) Regulations to the Medical Schemes Act were updated to include COVID-19, and the Council for Medical Schemes published updated PMB guidelines for COVID-19 promoting appropriate access to COVID-19 screening and testing. As part of these regulations, members are covered in full for COVID-19 testing, regardless of the test outcome, provided they were referred for the test by a healthcare professional after a COVID-19 consultation to determine the risk status of the member.
- Three potential scenarios have been modelled, with screening and testing projected to cost between R2.4 and R10.2 billion over the next 18 months.

SCENARIO	TEST PER DAY	TESTS OVER PERIOD	ESTIMATED COST
LOW (individuals with flu-like symptoms tested)	4 700	1.8m	R2.4bn
MEDIUM (current testing rate in private sector)	7 000	2.7m	R3.6bn
HIGH (maximum testing capacity in private sector)	20 000	7.9m	R10.2bn

- This is equivalent to costs of between R15 and R63 per beneficiary per month.

02 | COVID-19 HOSPITAL ADMISSIONS

- The Actuarial Society of South Africa has modelled the projected number of infections, hospital admissions and deaths in South Africa related to COVID-19 using a SEIR (multi-state) model; a model typically used by epidemiologists to model the progression of an infectious disease over time.
- An adjusted version of this model has been used, with the peak of the pandemic delayed to take account of the extended national lockdown. The cost per admission, based on the current experience of members on medical schemes administered by Discovery Health, has then been applied to project a total cost.

SCENARIO	HOSPITAL ADMISSIONS	ICU ADMISSIONS	ESTIMATED COST
LOW	58 000	10 000	R4.9bn
MEDIUM	136 000	23 000	R11.5bn
HIGH	255 000	42 000	R21.6bn

- This is equivalent to costs of between R30 and R134 per beneficiary per month.

PROJECTED COVID-19 RELATED EXPENSES ACROSS THE MEDICAL SCHEME INDUSTRY

TOTAL COVID-19 RELATED COSTS

- The additional claims related to COVID-19 screening, testing and hospital admissions are projected to cost medical schemes between R7.3 billion and R31.8 billion until June 2021. If these additional COVID-19 claims are spread out across all beneficiaries of medical schemes, it is equivalent to an additional cost of between R816 and R3 561 per beneficiary for 2020 and the first half of 2021.

SCENARIO	ESTIMATED COST	ESTIMATED COST PER BENEFICIARY
LOW	R7.3bn	R816
MEDIUM	R15.1bn	R1 697
HIGH	R31.8bn	R3 561

- The impact of the cost of screening and testing is assumed to be broadly similar for all medical schemes, as all schemes will be equally exposed to the progression of the pandemic in South Africa.
- The impact of the cost of COVID-19 admissions will vary among medical schemes, though, based on the demographic profile of the membership. Medical schemes with an older membership base are likely to experience higher admission rates (as a proportion of COVID-19 infections), and higher costs per admission.
- To estimate this impact, one can consider the difference in admission rates and costs per admission for members aged 65 and older, and those below the age of 65, and apply that to the membership of an individual medical scheme.

SCENARIO	ASSUMED ADMISSION RATE*	ASSUMED COST PER EVENT
0 – 64 YEARS	21.3%	R64 568
65 + YEARS	57.4%	R118 996

* Admission rate as a proportion of COVID-19 infections

IMPACT ON MEDICAL SCHEMES

The estimated additional costs to medical schemes due to COVID-19 can be used to determine a medical scheme's resilience to the pandemic, i.e. the ability to absorb the additional COVID-19 claims costs, while maintaining sufficient reserves to remain sustainable after COVID-19.

Medical schemes are required to hold reserves as protection against unexpected claims experience. At the time of setting contributions for 2020 (typically between August and September 2019), medical schemes would not have made an allowance for the impact of COVID-19.

The additional COVID-19 claims per beneficiary can be compared to the reserves held per beneficiary as 1) an indication of the adequacy of the reserves to cover the additional claims, and 2) the estimated level of reserves remaining after allowing for the impact of COVID-19

By considering these measures, the following schemes would be relatively worse off compared to others as a result of COVID-19:

- Schemes with an older membership base relative to other medical schemes are expected to experience a greater impact from COVID-19, due to a higher expected number of COVID-19 admissions, with higher related admission costs.
- Schemes with lower levels of reserves per beneficiary are likely to be compromised in terms of future sustainability after COVID-19, given the need to cover the unexpected COVID-19 claims from reserves.

PROJECTED COVID-19 RELATED EXPENSES ACROSS THE MEDICAL SCHEME INDUSTRY

SCHEME NAME	SCHEME SIZE	AVERAGE AGE	PENSIONER RATIO	RESERVE PER BENEFICIARY	COVID COSTS PER BENEFICIARY (medium scenario)	RESERVES: COVID COSTS (medium scenario)
Discovery Health Medical Scheme (DHMS)	> 200 000 beneficiaries	34,0	9%	6 319	2 182	2.9x
Scheme 1	> 200 000 beneficiaries	37,0	14%	6 382	2 345	2.7x
Scheme 2	> 200 000 beneficiaries	34,6	10%	5 742	2 196	2.6x
Scheme 3	> 200 000 beneficiaries	33,0	8%	3 827	2 162	1.8x
Scheme 4	100 000 - 200 000 beneficiaries	34,2	8%	9 797	2 157	4.5x
Scheme 5	100 000 - 200 000 beneficiaries	37,3	13%	8 603	2 316	3.7x
Scheme 6	100 000 - 200 000 beneficiaries	37,2	12%	7 831	2 281	3.4x
Scheme 7	100 000 - 200 000 beneficiaries	38,1	14%	7 799	2 347	3.3x
Scheme 8	20 000 - 99 999 beneficiaries	34,1	8%	26 508	2 152	12.3x
Scheme 9	20 000 - 99 999 beneficiaries	38,8	17%	13 579	2 425	5.6x
Scheme 10	20 000 - 99 999 beneficiaries	43,2	23%	11 998	2 644	4.5x
Scheme 11	20 000 - 99 999 beneficiaries	32,5	5%	7 906	2 057	3.8x
Scheme 12	20 000 - 99 999 beneficiaries	38,4	15%	5 680	2 380	2.4x
Scheme 13	20 000 - 99 999 beneficiaries	42,6	18%	2 723	2 479	1.1x
Scheme 14	20 000 - 99 999 beneficiaries	27,8	0%	1 124	1 929	0.6x
Scheme 15	< 20 000 beneficiaries	38,7	14%	22 391	2 346	9.5x
Scheme 16	< 20 000 beneficiaries	46,3	28%	19 567	2 805	7.0x
Scheme 17	< 20 000 beneficiaries	39,6	16%	17 539	2 394	7.3x
Scheme 18	< 20 000 beneficiaries	30,2	4%	12 744	2 036	6.3x
Scheme 19	< 20 000 beneficiaries	30,9	0%	8 427	1 924	4.4x
Scheme 20	< 20 000 beneficiaries	50,3	31%	6 430	2 899	2.2x
All open medical schemes		34,8	10%	6 640	2 214	3.0x
Open medical schemes excl. DHMS		35,8	11%	7 054	2 256	3.1x

Pensioner ratio: Number of beneficiaries aged 65 and older

Reserves: COVID costs: The number of times that the reserves per beneficiary can cover the COVID-19 costs per beneficiary. Value below 1 indicates insufficient reserves.

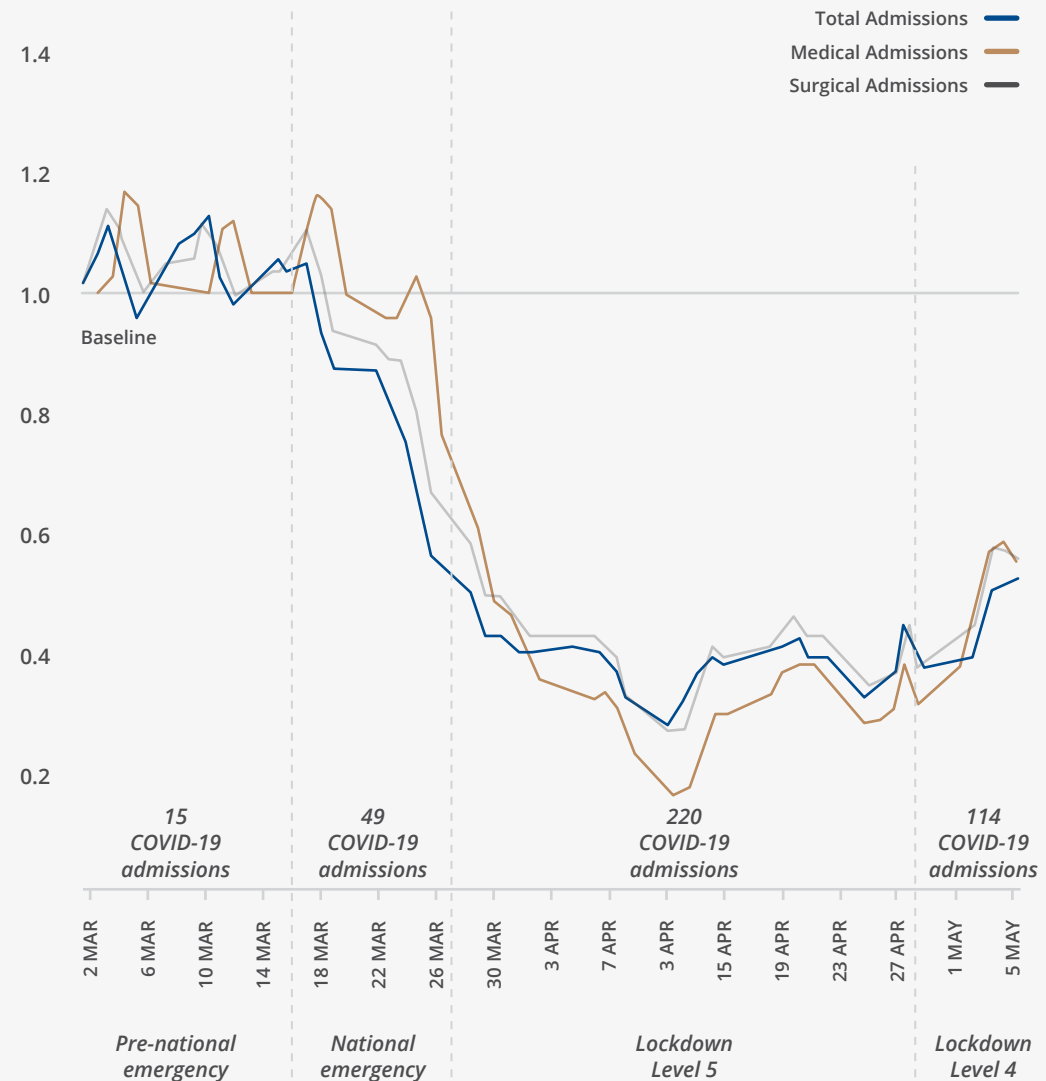
Notes: Scheme level impact based off most recent CMS annual report (2018/19) and excludes any surplus that may be generated in 2020 or 2021 due to decreased elective healthcare utilisation

PROJECTED COVID-19 IMPACT ON FINANCIAL POSITION OF MEDICAL SCHEMES

THE IMPACT OF COVID-19 OVER THE NEXT COUPLE YEARS ON THE FINANCIAL POSITION OF MEDICAL SCHEMES IS UNCERTAIN, AND WILL DEPEND ON VARIOUS FACTORS

- COVID-19 expenses covered by medical schemes will be offset, to some degree, by relatively lower claims for discretionary and elective healthcare episodes during the lockdown period:
 - Claims for discretionary and elective healthcare have decreased materially since the start of the lockdown period, particularly with regards to in-hospital admissions
 - This reduction may also be due to fears of members and healthcare professionals of contracting COVID-19
 - The extent and duration of this decreased utilisation is still very uncertain
 - There has already been an increase in utilisation levels since lockdown regulations have been eased from level 5 to level 4
 - The majority of elective procedures have been delayed, rather than cancelled, and are still expected to be funded by medical schemes
- Medical schemes are expected to generate a surplus of contributions over claims in 2020, given the decrease in elective hospital admissions in the first half of 2020, without a commensurate increase in COVID-19 claim costs.
- Medical schemes are expected to need this surplus to cover potential significant COVID-19 related admissions and testing costs during 2021, as it is expected that contributions will not be sufficient to cover these claims.
- As 2020 and 2021 progresses and further understanding of the impact of COVID-19 is gained, the expected financial impact can be better quantified.

WEEKDAY HOSPITAL ADMISSIONS INDEX



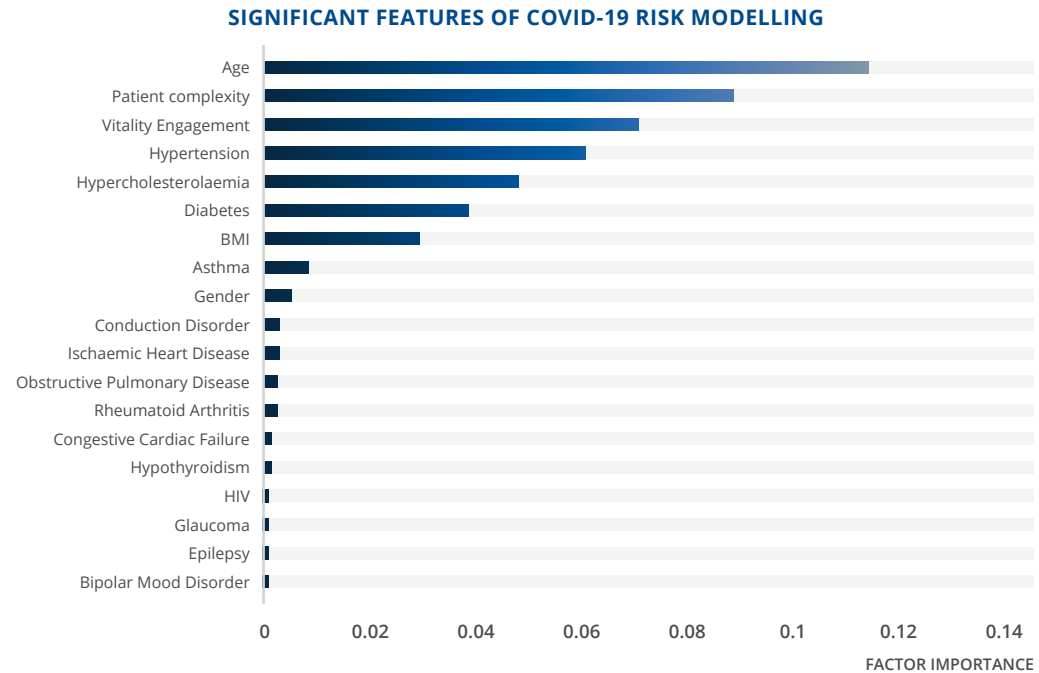
The COVID-19 Resilience Index

AN INDICATOR OF AN INDIVIDUAL'S RELATIVE
RISK OF BEING HOSPITALISED, SHOULD THEY
BE DIAGNOSED WITH COVID-19



DISCOVERY'S EMERGING PREDICTIVE MODEL FOR COVID-19 ADMISSION RISK

- There has been extensive research around the COVID-19 pandemic. However, findings are limited when assessing the impact of health and lifestyle on COVID-19 related risk.
- Discovery has unique insights into the risk factors driving COVID-19 related hospitalisation based on the extensive healthcare data available on the 3.5 million lives under administration by Discovery Health.
- As of 14 May, approximately 12% of all South African COVID-19 patients are members of medical schemes administered by Discovery Health. Of the 1 539 confirmed positive cases, approximately 23% resulted in a hospital admission, with this admission rate varying materially by various risk factors
- Discovery has used advanced machine learning techniques to identify the impact of demographic, health and lifestyle-related factors on the risk of being hospitalised if diagnosed with COVID-19. The modelling approach isolates the extent to which an individual factor increases the risk.
- The model considers 32 demographic, health and lifestyle factors, isolating the most relevant factors to predict an admission.



This paper identifies the most relevant demographic, health and lifestyle factors in predicting COVID-19 admission risk including:

01 | Age is the strongest predictor of COVID-19 related admission risk, with older members having a 19% to 25% elevated risk of hospitalisation if diagnosed with COVID-19. Whilst the modelling indicates that males do have a higher risk of admission due to COVID-19, more important risk factors relate to specific chronic diseases, such as diabetes.

02 | The incidence of chronic conditions can increase the risk of COVID-19 related admission by up to 18%, dependent on the number of chronic conditions. Hypertension, diabetes and hypercholesterolemia have the largest impact on COVID-19 related risk with an estimated impact of between 11% – 13% per condition. A member's overall clinical complexity and current healthcare utilization are also strong predictors of elevated risk.

03 | Additionally, members with a Vitality Age lower than or equal to their actual age are at 11% lower risk of COVID-19 related admission when compared to those with a Vitality Age four years older than their actual age. Members who engage in Vitality have an 11% lower risk of hospitalisation on contraction of COVID-19 when compared to non-Vitality members.

04 | Positive effects of healthy living can offset the elevated risks of chronic conditions and aging. An individual that is 65 years but engaged in their health and wellness has the same COVID-19 hospital admission risk as an unengaged 55-year old. Similarly, members with chronic conditions can offset their elevated COVID-19 risk through healthy living.

Discovery is applying these insights to provide a personalised COVID-19 risk index for all South Africans. The risk index allows further segmentation of high risk members using available demographic, health and lifestyle characteristics, illustrating an individual's risk of COVID-19 related admission should they contract the virus. For those South Africans that are not members of Discovery Health Medical Scheme, the index will use self-reported data allowing the individual to understand their risk to the virus and take the necessary steps to limit their exposure.

DEMOGRAPHIC FACTORS RELATED TO COVID-19 HOSPITAL ADMISSION RISK

Various studies have shown that males and individuals of older ages that are diagnosed with COVID-19 are at greater risk of hospitalisation and fatality. There is however limited research into the extent that age or gender, when isolated from other factors, increases the risk. For example, the majority of individuals of older ages have at least one chronic condition with questions as to whether the increased risk is attributable to the individual's age, or their underlying health status.

AGE

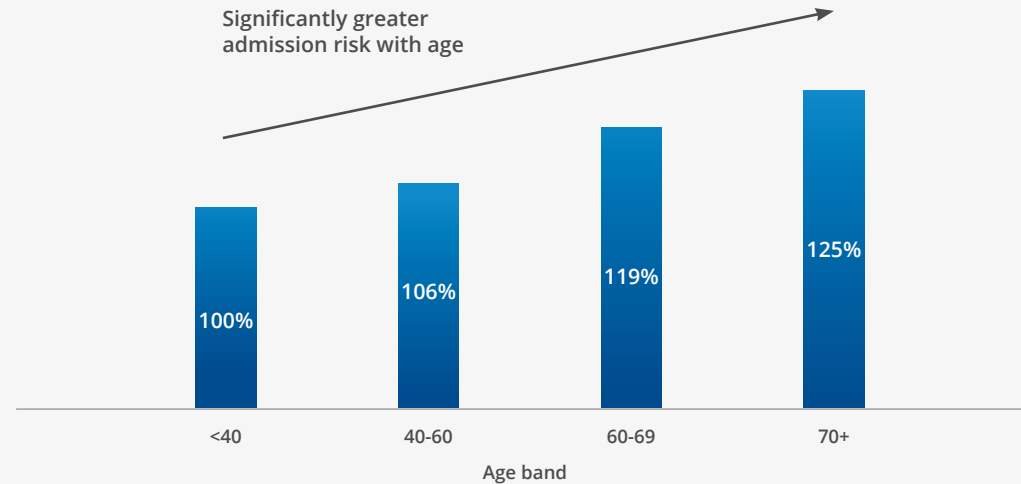
Discovery's analysis highlights that the risk of hospitalisation if diagnosed with COVID-19 is between 19% and 25% higher for individuals of older ages. Such a result is intuitive, with the natural aging process weakening the immune system and increasing an individual's susceptibility to the virus. Such findings are aligned to international research, which shows the significantly elevated health risk of older individuals to COVID-19.

GENDER

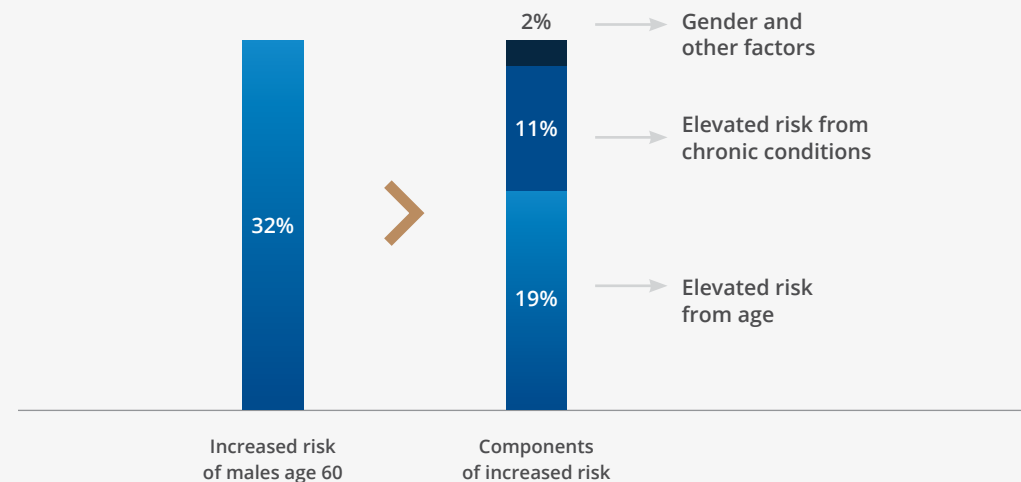
Discovery's analysis suggests that while males face a higher risk of admission than females, more important risk factors relating to chronic conditions such as diabetes explains the risk.

Several international studies confirm the higher hospitalisation rates among males. In New York City¹, a greater proportion of individuals admitted to hospital were males (60.3%). In the United Kingdom⁴, 60% of the ~17 000 patients hospitalized were males, with gender one of the factors relating to mortality.

ELEVATED COVID-19 ADMISSION RISK BY AGE



EXPLAINING THE ELEVATED ADMISSION RISK BY GENDER

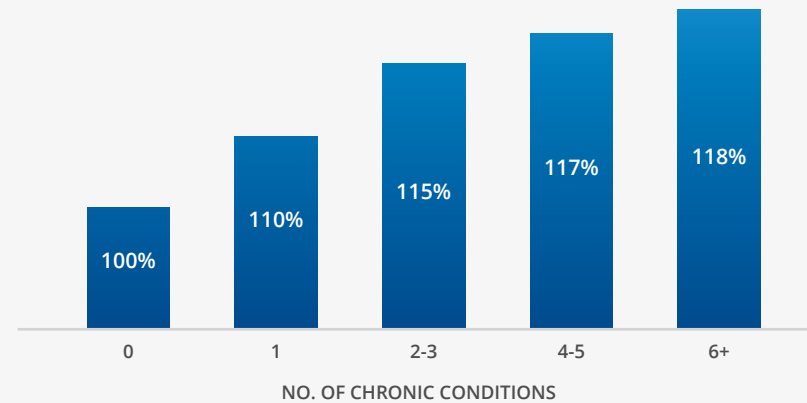


CLINICAL FACTORS RELATED TO COVID-19 HOSPITAL ADMISSION RISK

The incidence of chronic conditions increases the risk of admission for COVID-19 treatment, with multiple chronic conditions increasing the risk by as much as 18% relative to patients with no chronic conditions. Diabetes, hypertension and hypercholesterolemia were found to have the highest impact on COVID-19 related hospitalisation risk, while initial results indicate that HIV may have limited influence on COVID-19 hospitalisation risk.

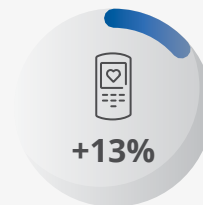
- Discovery data shows that the incidence of a chronic condition increases the risk of COVID-19 related admissions by 10%.
- Additional chronic conditions have a diminishing additive effect on COVID-19 related admission.
 - Members with 2-3 chronic conditions experience 5% – 7.5% additional COVID-19 related risk per chronic condition
 - The maximum impact from multiple comorbidities results in 18% elevated risk
- Hypertension, diabetes and hypercholesterolemia have the largest impact on COVID-19 related risk with an estimated impact of between 11% – 13% per condition.
- Data from the Centre for Disease Control across the US, Europe and China, support Discovery's findings in identifying hypertension, diabetes and cardiovascular disease as the most common comorbidities recorded in critically ill hospitalised patients.
- Initial results indicate that HIV may have limited influence on COVID-19 hospitalisation risk. A recent Lancet study confirmed that there is no evidence from China that the risk of infection or COVID-19 related complications are higher among people living with HIV, who are clinically and immunologically stable on antiretroviral treatment, when compared with the general population. This is also aligned to the World Health Organisation's position that people with well-controlled HIV do not appear to be at elevated risk of coronavirus infection or severe disease.

ELEVATED ADMISSION RISK WITH MULTIPLE CHRONIC CONDITIONS



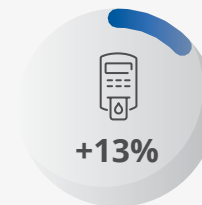
CHRONIC CONDITIONS WITH THE GREATEST IMPACT ON THE RISK OF COVID-19 HOSPITAL ADMISSION

Hypercholesterolaemia



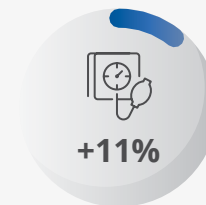
Members with hypercholesterolaemia have a 13% increased risk of admission compared to those without hypercholesterolaemia

Diabetes



Members with diabetes have a 13% increased risk of admission compared to those without diabetes

Hypertension



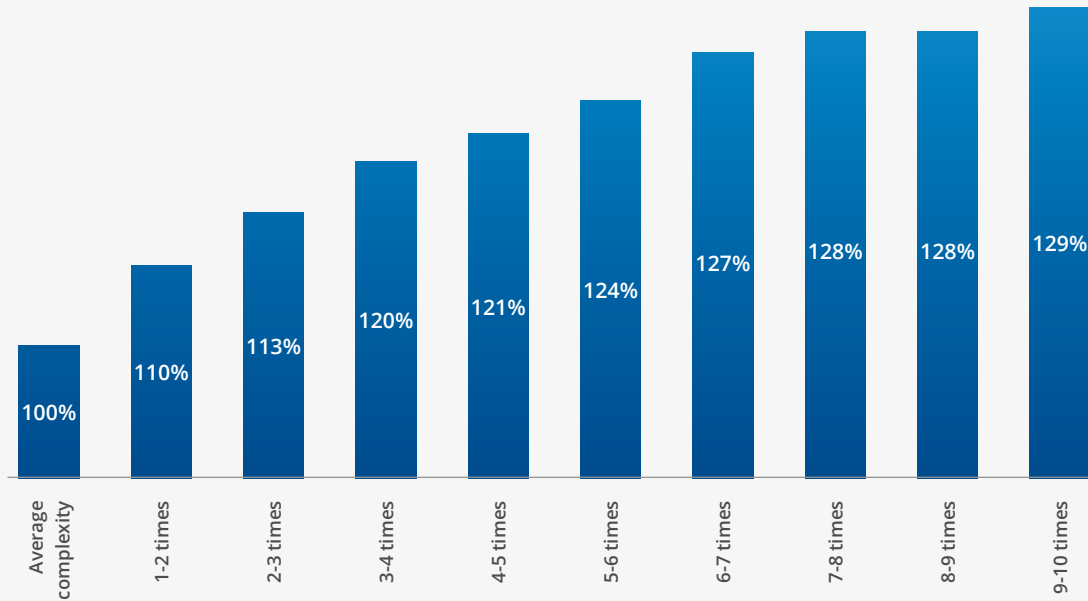
Members with hypertension have a 11% increased risk of admission compared to those without hypertension

EXPECTED HEALTHCARE UTILISATION AS AN INDICATOR OF COVID-19 HOSPITAL ADMISSION RISK

In addition to chronicity, a member's overall clinical complexity and current healthcare utilisation are a strong predictor of elevated risk. Discovery can assess the current healthcare requirement of an individual based on a member's demographic information, medical history and healthcare claims. These factors describe the healthcare complexity of the patient. Members with a low complexity are at 11% lower risk of COVID-19 related hospitalisation.

- Patient complexity represents the most significant health-related factor in predicting hospitalisation:
 - Members who have five times more complex healthcare requirements have a 20% higher risk of COVID-19 related admission compared to the average medical scheme member.
 - In isolation, patient complexity can have a maximum effect of 29% higher risk of COVID-19 related admission, for members that require more than 10 times the healthcare resources of the average member. High patient complexity can be attributed to other conditions, such as cancer.

MEMBERS WITH A HIGHER PATIENT COMPLEXITY ARE AT INCREASED ADMISSION RISK



BENEFITS OF HEALTHY LIVING TO REDUCE COVID-19 HOSPITAL ADMISSION RISK

Vitality Age is a risk-adjusted health assessment tool giving individuals a snapshot of their overall health based on self-reported lifestyle choices and clinical risk factors. The differential between one's Vitality Age and actual age has been shown to be a strong predictor of the likelihood of hospitalisation if diagnosed with COVID-19.

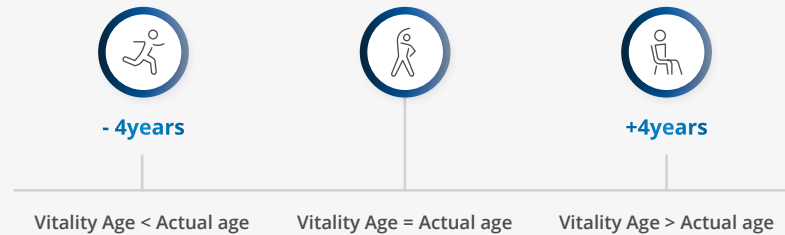
- The following aspects of wellness are collectively assessed through self-reported data to produce an individual's Vitality Age:

 Medical history	 Exercise frequency	 Healthy behavior (smoking, alcohol consumption)
 Key physical metrics	 Nutrition (eating habits)	 Mental wellbeing (stress management, interaction, productivity)

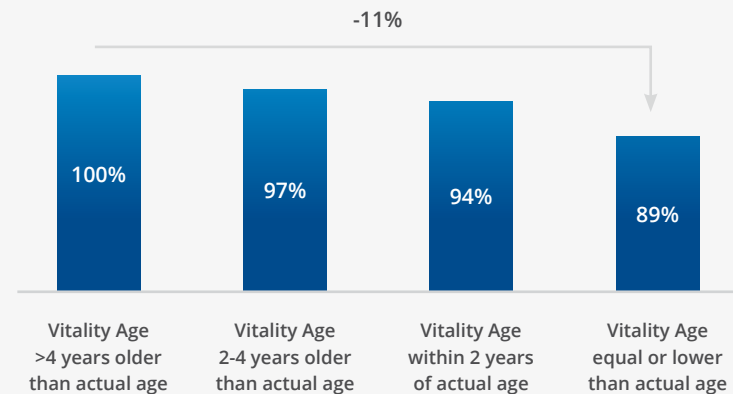
- An individual with a Vitality Age lower than their actual age represents someone in better health than the average person of that age. Similarly, an individual with a Vitality Age higher than actual age represents an individual in poorer health than the average person of that age.
- The difference between Vitality Age and current age is a significant predictor of COVID-19 related hospitalisation risk. Members with a Vitality Age lower than or equal to their actual age are at 11% lower risk of COVID-19 related admission when compared to those with a Vitality Age four years greater than their actual age.
- Individuals can improve their Vitality Age differential by stopping bad habits such as smoking and excess alcohol consumption and engaging in healthy behaviours such as increased physical activity and healthy eating.

METRICS REPRESENTING VITALITY AGE

VITALITY AGE LOWER THAN ACTUAL AGE	VITALITY AGE WITHIN 1 YEAR OF ACTUAL AGE	VITALITY AGE HIGHER THAN ACTUAL AGE
4-5 Cardio metabolic metrics in range*	3-4 Cardio metabolic metrics in range*	<3 Cardio metabolic metrics in range*
>4 exercise sessions per weeks	2-4 exercise sessions per week	<2 exercise sessions per week
>5 servings of fruit and veg per day	3-5 servings of fruit and veg per day	<3 servings of fruit and veg per day



THE DIFFERENCE BETWEEN VITALITY AGE AND CURRENT AGE IS A STRONG INDICATOR OF COVID-19 HOSPITAL ADMISSION RISK



BENEFITS OF HEALTHY LIVING TO REDUCE COVID-19 HOSPITAL ADMISSION RISK

Lifestyle behaviours can reduce the impact of COVID-19 related hospitalisation risk by up to 11%. Behaviours such as engaging in physical activity are encompassed in the Vitality programme, with the risk reduction effects for engaged Vitality members able to offset the elevated risk due to aging and other health-related factors.

- The Vitality programme is based on verified engagement in healthy behaviours. Members who engage in the programme have an 11% lower risk of hospitalisation on contraction of COVID-19 when compared to non-Vitality members. COVID-19 related hospitalisation risk decreases even at low levels of engagement, with Bronze members experiencing 6% lower risk compared to non-Vitality members.
- The importance of healthy living:

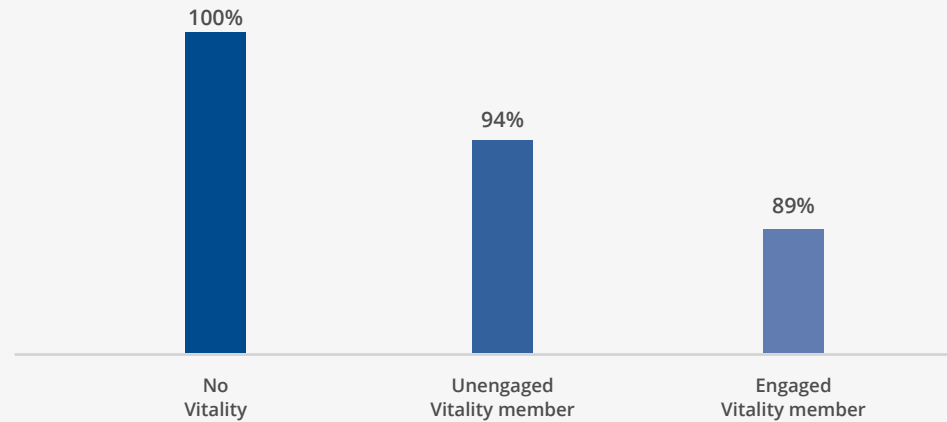
1 | Engagement in Vitality can offset the elevated COVID-19 risk associated with aging:

Members over 65 are most vulnerable to hospitalisation if diagnosed with COVID-19. The elevated risk of aging can be offset through healthy living. An individual that is 65 years or older but engaged in their health and wellness has the same COVID-19 hospital admission risk as an unengaged 55-year old.

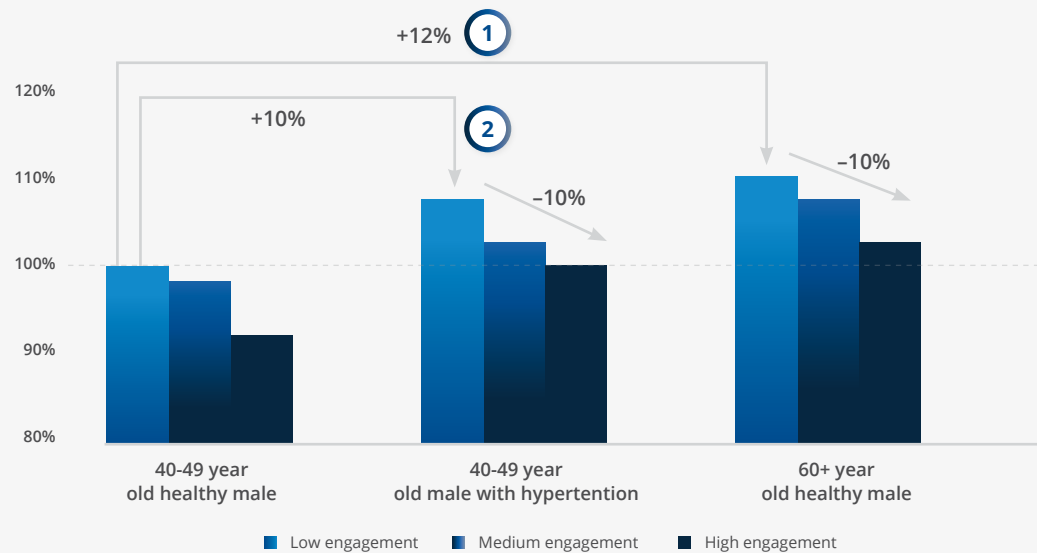
2 | Engagement in Vitality can offset the elevated COVID-19 risk associated with lifestyle related chronic conditions:

Similarly, members with a chronic condition can offset their elevated risk. A 40-49 year old male with hypertension, but highly engaged in healthy behaviours, has the same risk as an unengaged 40-49 year old male without chronic conditions.

ENGAGEMENT IN VITALITY REDUCES COVID-19 HOSPITAL ADMISSION RISK



VITALITY ENGAGEMENT CAN MODULATE OTHER RISK FACTORS



AN ADVANCED PERSONALISED RISK INDEX FOR ALL SOUTH AFRICANS

Discovery is applying these insights to provide a personalised COVID-19 risk index for all South Africans. The risk index allows further segmentation of high risk members based on their demographic, health and lifestyle characteristics. The index will be updated and refined as the pandemic develops and as we gain more insight around risk factors.

- The risk index uses available demographic, health and lifestyle information to calculate the risk of hospitalisation from COVID-19 after contracting the virus.
- How it works:
 - 01 | An individual will be assigned a risk score expressing their elevated or reduced risk of COVID-19 related hospitalisation.
 - 02 | The components of the risk score contributing to elevated or reduced risk are explained across:
 - Demographic factors affecting risk (age and gender)
 - Health related risk factors (pre-existing chronic conditions and current health)
 - Lifestyle behaviours to reduce risk (physical activity, nutrition, screening)
 - 03 | Understanding the vulnerability to COVID-19 better equips an individual to:
 - reduce their risk by engaging in the relevant healthy behaviours
 - determine the extent of physical distancing and stay-at-home measures required to limit exposure to the virus

ACCESSING THE COVID-19 RESILIENCE INDEX

Discovery Members	Non-Discovery Members
Access their pre-calculated personalised risk index by logging on to the Discovery website.	Calculate their risk score by completing four key questions to further inform the most relevant risk factors and stratify the risk of the individual.

COVID-19 RISK CATEGORIES

The risk index classifies a member into a risk category based on their risk of admission, should they contract the virus:

- Very low risk
- Low risk
- Medium risk
- High risk
- Very high risk

WHAT IS YOUR PERSONAL COVID-19 RISK INDEX?

Your COVID-19 risk is determined relative to that of a healthy 43 year old male who does not adopt healthy living behaviours.

As a healthy 35 year old who engages in Vitality you have a Risk Index of 83% which puts you at Very Low risk of COVID-19 related hospitalisation.



COMPONENTS OF YOUR COVID-19 RISK

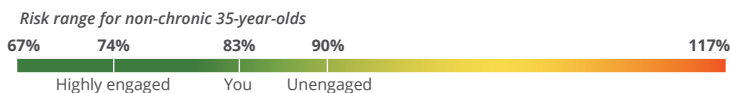
People like you aged 35 typically face lower risk of COVID-19 related admission. People in your age category experience the following risk range:



Because you do not suffer from any chronic conditions your risk is even lower than the average 35 year old.



Because you are engaged in Vitality your risk is reduced but could be reduced even further with increasing engagement.



OUTCOMES OF THE COVID-19 RESILIENCE INDEX

The outcomes of the COVID-19 Resilience Index allows more granular risk stratification, distinctly showcasing the demographic, health and lifestyle components of elevated risk and the steps required to reduce this risk.



ALL RISK SCORES ARE COMPARED TO A BENCHMARK INDIVIDUAL:

43 year old | Male | No chronic conditions | Unengaged in Vitality

CASE 1: 35 year old male | No chronic conditions | Engages in Vitality

- Risk Index: Very Low. He has a 19% lower risk of COVID-19 related hospitalisation upon contracting the virus, placing him at very low risk relative to the benchmark individual
- His age improves his risk by 9% relative to the benchmark 43 year old
- Further improved by high engagement in healthy behaviours through Vitality of 9%
- All of his risk is explained by the factors mentioned in this paper.

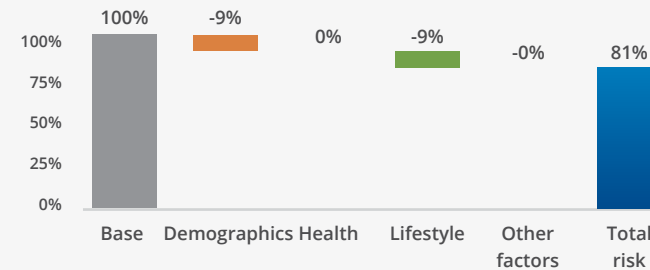
CASE 2: 62 year old female | Hypertension | Engages in Vitality

- Risk Index: High. This member faces a 21% elevated risk of COVID-19 related hospitalisation.
- The majority of elevated health risk for this member arises from her age and prevalence of hypertension.
- This member is able to almost completely offset one of these factors through high engagement in healthy behaviours reducing her risk by 11%.
- Factors not examined in this paper contribute 3% to her risk.

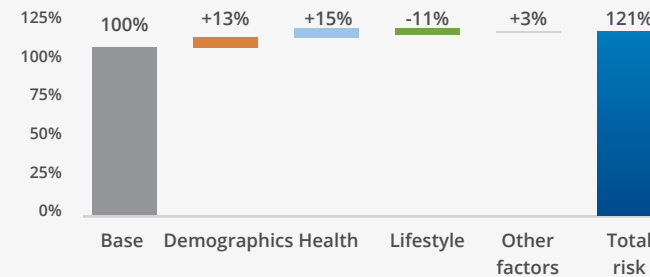
CASE 3: 51 year old male | Hypertension and diabetes | No engagement in Vitality

- Risk index: High. Despite his age this member faces a 27% elevated risk classifying him as 'High' risk
- The majority of the risk is attributable to his diabetes and hypertension increasing risk by 13% and 12% respectively
- This member is not engaging in healthy behaviour to improve his risk
- Factors not examined in this paper contribute 2% to his risk.

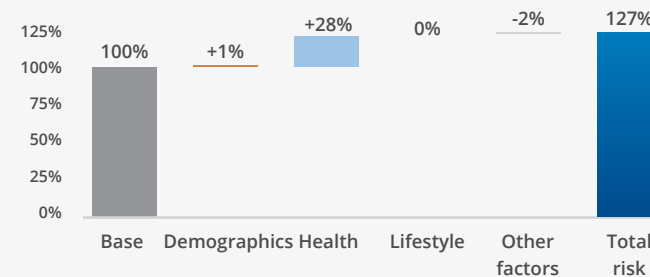
35 YEAR OLD MALE WITH NO CHRONIC CONDITIONS WHO ENGAGES IN HEALTHY BEHAVIOUR



62 YEAR OLD FEMALE WITH HYPERTENSION WHO ENGAGES IN HEALTHY BEHAVIOUR



51 YEAR OLD MALE WITH HYPERTENSION AND DIABETES WHO DOES NOT ENGAGE IN HEALTHY BEHAVIOUR



STUDY 1: NEW YORK CITY

Reference: Richardson S, Hirsch JS, Narasimhan M, et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized with COVID-19 in the New York City Area. JAMA. Published online April 22, 2020. doi:10.1001/jama.2020.6775

This study represents the first large case series of sequentially hospitalized patients with confirmed COVID-19 in the United States. Older persons, men, and those with pre-existing hypertension and/or diabetes were highly prevalent in this case series, corroborating similar findings regarding pre-existing conditions reported in China and now in the Discovery data.

Outcomes were assessed for 2,634 patients who were discharged or had died at the study end point. During hospitalization, 373 patients (14.2%) were treated in the intensive care unit care, 320 (12.2%) received invasive mechanical ventilation, 81 (3.2%) were treated with kidney replacement therapy, and 553 (21%) died. Mortality for those requiring mechanical ventilation was 88.1%.

STUDY 2: CHINA

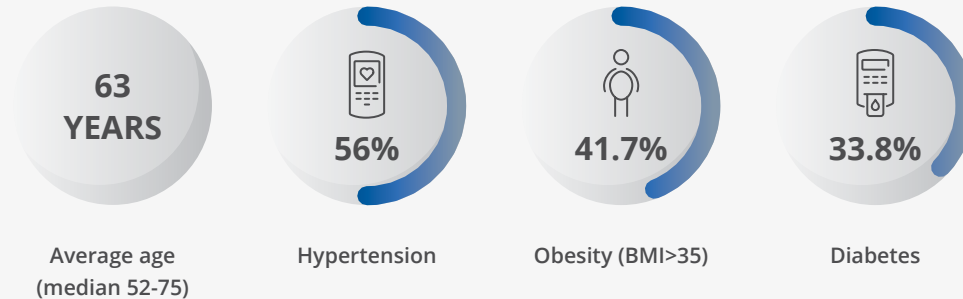
Comprehensive COVID-19 hospitalization and death rate estimates help countries best prepare as global pandemic unfolds

Reference: The Lancet Infectious Diseases. March 2020. Accessed on https://www.eurekalert.org/pub_releases/2020-03/tl-pss_1033020.php

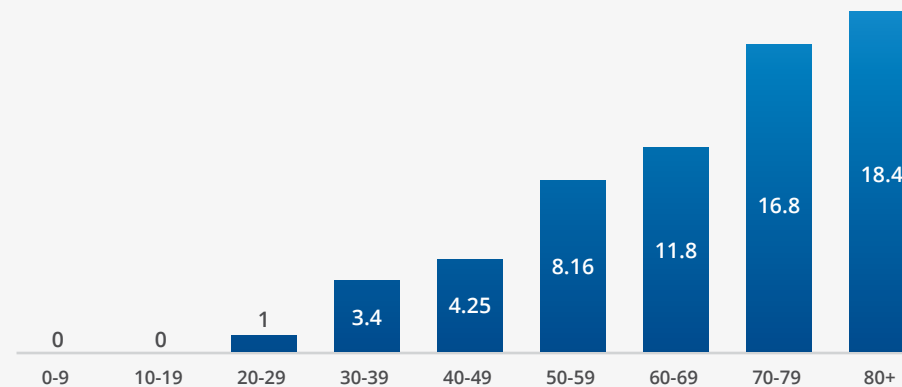
This paper estimates the proportion of COVID-19 cases likely to be severe enough to require hospitalisation. 11.8% of people in their 60s, 16.6% of people in their 70s and 18.4% of those in their 80s and above will require hospitalisation as a result of contracting COVID-19. The paper adjusts for the under-reporting of milder cases.

It should be noted that the proportion of all are hospitalised infections were estimated from a subset of 3,665 cases reported in mainland China and adjusted for demography and under-ascertainment.

BASELINE CHARACTERISTICS OF PATIENTS HOSPITALISED WITH COVID-19 (1 MARCH – 4 APRIL 2020)



ESTIMATED PROPORTION OF ALL COVID-19 INFECTIONS THAT WILL REQUIRE HOSPITALISATION



APPENDICES

STUDY 3: UNITED STATES

Reference: Garg S, Kim L, Whitaker M, et al. Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020. MMWR Morb Mortal Wkly Rep 2020;69:458–464. DOI: <http://dx.doi.org/10.15585/mmwr.mm6915e3>

This study is noteworthy in that it reflects data from the first month of hospital surveillance (March 2020) with the catchment area representing approximately 10% of the American population. The data generated from this study confirms that hospitalization rates in the USA increase with age and the majority of hospitalized patients have underlying conditions

UNDERLYING CONDITIONS AND SYMPTOMS AMONG ADULTS AGED ≥18 YEARS WITH CORONAVIRUS DISEASE 2019 (COVID-19)-ASSOCIATED HOSPITALIZATIONS

UNDERLYING CONDITION	AGE GROUP (YRS), NO./TOTAL NO. (%)			
	OVERALL	18–49	50–64	≥65 YEARS
Any underlying condition	159/178 (89.3)	41/48 (85.4)	51/59 (86.4)	67/71 (94.4)
Hypertension	79/159 (49.7)	7/40 (17.5)	27/57 (47.4)	45/62 (72.6)
Obesity	73/151 (48.3)	23/39 (59.0)	25/51 (49.0)	25/61 (41.0)
Chronic metabolic disease	60/166 (36.1)	10/46 (21.7)	21/56 (37.5)	29/64 (45.3)
Diabetes mellitus	47/166 (28.3)	9/46 (19.6)	18/56 (32.1)	20/64 (31.3)
Chronic lung disease	55/159 (34.6)	16/44 (36.4)	15/53 (28.3)	24/62 (38.7)

STUDY 4: UNITED KINGDOM

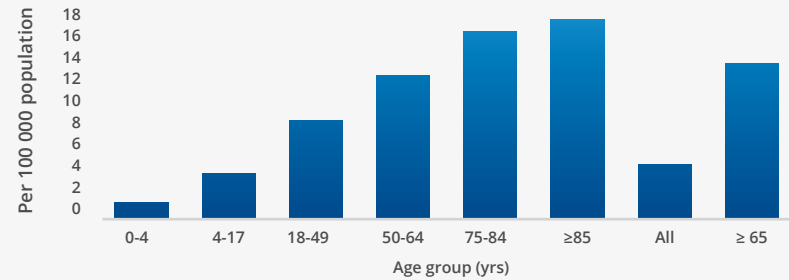
Features of 16,749 hospitalised UK patients with COVID-19 using the ISARIC WHO Clinical Characterisation Protocol

Reference: Docherty, A, Harrison E, Green, C et al. Features of 16,749 hospitalised UK patients with COVID-19 using the ISARIC WHO Clinical Characterisation Protocol. Published on medRxiv, 28 April 2020. DOI: <https://doi.org/10.1101/2020.04.23.20076042>

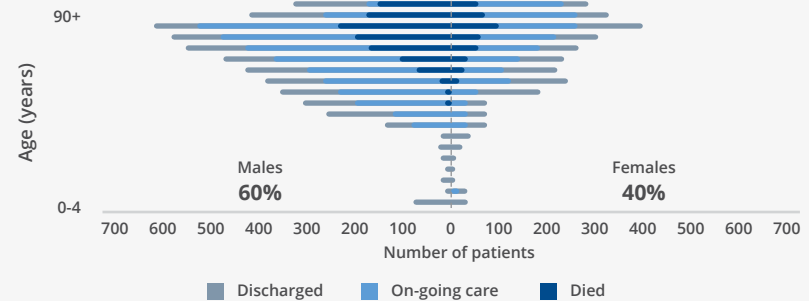
This research paper studied the clinical features of 16,749 COVID-19 patients admitted to 166 hospitals in England, Wales and Scotland, between 6 February and 18 April 2020. At the time of publication, this study sample represented 14.7% of all people who have tested positive for COVID-19 in the UK.

As suspected, increased age and comorbidities, most noticeably chronic cardiac disease and diabetes, as well as obesity were associated with a higher probability of mortality within this cohort. Men were admitted to hospital and ultimately died of COVID-19 related complications.

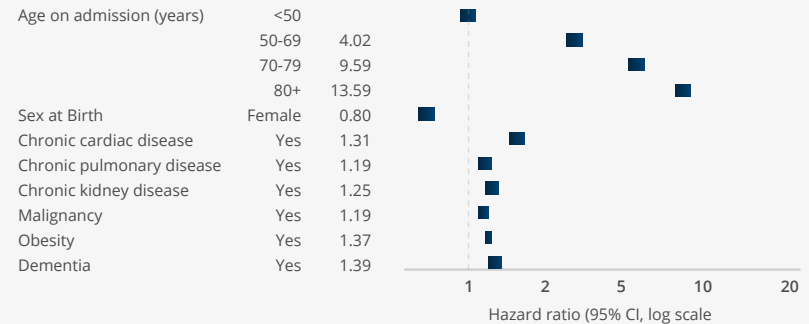
FIGURE 1. LABORATORY-CONFIRMED CORONAVIRUS DISEASE 2019 (COVID-19)-ASSOCIATED HOSPITALISATION RATES, *BY AGE GROUP – COVID-NET, 1 STATES, MARCH 1-28, 2020.



PATIENTS WITH OUTCOME STRATIFIED BY AGE, AND SEX



SURVIVAL FROM SYMPTOM ONSET IN PATIENTS IN HOSPITAL WITH COVID-19





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