Analysis of COVID-19 risk assessment tools

For GPs and their staff
Introduction

The RCGP leadership team have been trying to collate the varied advice on risk assessment for GPs and their staff, in order to support and advise the individual and their employers as to how carry out a COVID-19 risk assessment. We have looked at the varied tools and guidance that are published and have explored how these tools vary and how they might be used by GPs in supporting the risk assessment process for themselves and their staff. These have been considered alongside the emerging evidence from sources such as Public Health England\(^{2,3}\) and the advice of NHS Employers\(^{4}\) and the Faculty of Occupational Medicine\(^{5}\). Four tools were explored: the SAAD score, Welsh Risk Assessment Tool, the Objective Risk Stratification Tool and COVID Age. These were considered alongside knowledge gained from the PHE analysis of risks and outcomes of COVID-19.

It is important to recognise that the evidence base is very new and incomplete, and that further research will be needed to determine how the various risk factors interact. We can now identify the hazard and exposure risks with some confidence, but we know less as to how personal factors contribute to risk and how these combine to form an individual’s risk when exposed to the virus\(^{1}\).

The review has not attempted to assess the accuracy of any methodology or statistical analysis undertaken within the tools where this has been published.

Review of Risk Assessment Tools

Four tools - the Safety Assessment And Decision Score\(^{6}\), the All Wales COVID-19 Workforce Risk Assessment Tool\(^{7}\), the COVID-19 Medical Risk Assessment\(^{8}\) and the Objective Risk Stratification Tool\(^{15}\) - have been identified and their features summarised.


Safety Assessment And Decision (SAAD) Score (2) (6)

Aimed at BAME Communities working in General Practice

Age  
Stratifies from over 40 to 70 and above

Ethnicity  
Splits by ethnicity

Sex  
Scores male higher than female

Obesity  
Ranks Obesity from BMI >23 (where applied to BAME group)

Pregnancy  
Determines that later pregnancy is higher risk than before 28 weeks

Co Morbidities  
Usual list of co-existing conditions; two diseases together score higher

Vitamin D Deficiency  
Rates Vitamin D deficiency as a risk factor.

Commentary: Inclusion of Vitamin D is unique to this score and does not appear in other studies to be an independent risk factor\(^9\). The Oxford Centre for Evidence-Based Medicine rapid review concluded that there was no evidence for Vitamin D deficiency predisposing to COVID-19\(^{10}\). Several risk factors that would normally cause people to take enhanced care e.g. aged 70+ are included. The score has been produced by GPs, and the methodology used, and data sources have not been quoted by the authors. Pregnancy is included in the risk score calculation: this has been subject to separate analysis and risk assessment in other documents\(^{11}\).

All Wales Risk Assessment Tool COVID-19\(^7\) (BAPIO)

This was developed by a group of clinicians, statisticians, public health experts and epidemiologists with lay representation. Aimed at all health staff and settings, it has been created and recommended by the Welsh Government for use in Wales. The group considered evidence from various large studies like the ISARIC, ICNARC, ONS, Open Safely collaborative, and various papers from other countries and universities.

Age  
Stratifies risk from over 50 to 69 (70 and above excluded from score)

Ethnicity  
Single score for all BAME group and does not differentiate between ethnic groups

Obesity  
Over 30 BMI or waist circumference

Sex  
Scores Male

Pregnancy  
Excluded from Score

Co Morbidities  
Each morbidity scores individually

Vitamin D  
Not included

Sickle Cell Trait / Thalassaemia  
Included

Commentary: Does not include people who would independently be deemed at higher risk, e.g. 70 and above, pregnancy. Sickle cell trait, thalassaemia and other haemoglobinopathies are included as a possible risk factor even that there is no clear
evidence that they predispose anyone to higher risk of death from COVID-19. This was believed to be one potential cause of higher mortality in the BAME group. Produced and published by Welsh Health Boards. The methodology is not explained but has been shared by the lead authors. Authorship includes the Chair of BAPIO and the tool is promoted by BAPIO.

**COVID-19 Medical Risk Assessment (COVID Age)**\(^{(12)}\)

Age, Sex, Ethnicity, Comorbidities are all scored in terms of added or subtracted years of risk, and bench marked against the risk of a 47-year-old adult. It uses data from the Open Safely collaborative\(^{(13)}\) and other sources in the same way as the All Wales tool but performs statistical analysis to derive its scores.

**Commentary:** The Methodology is clearly described\(^{(14)}\); it does not address pregnancy and is not GP focused. The mathematical modelling may be useful where the risk factors produce large numbers of deaths, e.g. elderly males, but will inevitably be less reliable where deaths are fewer, e.g. young females. It then attributes risk to the COVID Age but uses non-descript term “Mid 70s” as the cut off between very high and high risk.

**Objective Risk Stratification Tool**\(^{(15)}\)

Currently presented for publication but not peer reviewed. Has had BMA involvement in its production. It attributes risk by creating a score by adding a point for every approximate doubling of risk compared to a reference population. Age, Sex, Ethnicity, Diabetes, Obesity, Co Morbidities are included.

**Commentary:** The methodology is clearly described. Patients already shielding are excluded from inclusion in the calculation. Pregnancy is not commented upon. People of Filipino descent are specifically identified as a risk group.

**Disparities in the risk and outcomes of COVID-19,PHE Reports**\(^{(2,3)}\)

Overall assessment explores Age, Sex, Geography, Deprivation, Ethnicity, Occupation, Inclusion in Health Groups, Care Homes and Co-morbidities.

**Commentary:** This suite of documents explores the personal risk factors and challenges of using these to understand why the characteristics of the individual produce an increased risk of catching COVID-19 and having an adverse outcome.
Discussion

The methodology for two of the tools (SAAD and All Wales) is not readily visible, and it is not transparent as how these have been used to derive risk. All derive their views from similar data sources, which is incomplete as the prevalence of disease may not be the same in all ethnic groups\(^{(3)}\). The use of hospitalised patient data may not reflect risk of getting the disease but the risk of severe disease.

For some of the determinants of risk included it can be assumed that exposure is going to be broadly similar, but for others it may not be. Similarly, in certain groups, e.g. young adults, the amount of data may be low, and this may be subject to undue influence of co-existing vulnerabilities. This limitation is identified by the PHE document when assessing risk. Nor can the association with a particular risk factor always be assumed to be causal.

One tool (SAAD) includes Vitamin D deficiency in its calculation which is often unknown by the individual being assessed and which other independent studies have suggested is not a risk factor. For this reason alone, this tool should probably be discounted as impractical and without sufficient evidence.

The All Wales Risk Assessment Tool was commissioned by the Welsh Government and is endorsed by BAPIO. The inclusion of Sickle Cell Trait, Thalassaemia and haemoglobinopathies is unique to this score and was felt to be one possible explanation for the micro-emboli that have been observed in post-mortem of a number of COVID-19 fatalities.

The COVID Age tool publishes its methodology and sources. It looks like there were few deaths recorded in lower age groups so that co-existing vulnerabilities may adversely affect the risk analysis in these groups. It does not look at the groups who would be advised under general criteria to take enhanced care with respect to social isolation, i.e. over 70s.

"As part of managing the health and safety of any work activity one must control the risks in the workplace. To do this one needs to think about what might cause harm to people and decide on reasonable steps to prevent that harm. This is known as risk assessment and it is something that is required by law.

After identifying the Hazard, key factors when undertaking Risk Assessment are: environmental factors (including exposure measurement) and human factors (who might be at risk and how/why), which includes personal factors, health, risk behaviours etc.

With Covid-19, although we can readily identify the hazard and even exposure (e.g. environmental survey and testing), as well as some of the exposure risks (e.g. environmental survey, type of work being undertaken – clinic setting versus ITU), and there is a growing body of international scientific evidence to support this, what is unfortunately lacking is the evidence base on the personal risk factors as related to ethnicity, age, weight, and other pre-existing health conditions. We don't know, for example, whether the risk is additive, synergistic. As more scientific evidence on such issues becomes available, our risk assessment advice may also need to change."

Prof Dil Sen Academic Dean Faculty of Occupational Medicine\(^{(1)}\)
None of the tools can be judged to be entirely predictive as all are evidenced on retrospective data, and, for some factors, small numbers of cases. The authors of the SAAD tool have not supplied their methodology for comment. The choice if a tool has to be used should be between the All Wales Risk Assessment Tool and the COVID Age tool, accepting their limitations. These should form part of the discussion of risk and risk mitigation with an individual, and their ability to predict an individual's risk and particularly the interaction of risk factors to create that risk is untested. These discussions ideally should be separated from the challenges of service provision, but in reality, for a small practice may be extremely challenging.

Pregnancy and particularly pregnancy in women from the BAME Group appear to be over represented in patients being admitted to hospital with COVID-19\(^{(11)}\). The risk posed by pregnancy is currently being studied by UK Obstetric Surveillance System (UKOSS)\(^{(16)}\) The risk assessment of pregnant patients should be considered independently of any other risk factors and following relevant national guidance, We are aware that NHS England are seeking to develop a data-driven risk prediction model for patients, which we assume will have implications for those who work in health and social care\(^{(17)}\).

Risk evaluation may become clearer as we learn more about the virus and how risk factors are represented across the population. Genomics may be one source of additional information that will give us more understanding in the future\(^{(18)}\) as to how risk is determined.

Dr Simon N Stockley
24/6/20

References


**Disclaimer**

The views contained within the document are those of the author who is a GP Generalist who might be called upon to make such a risk assessment, and not those of an epidemiologist or trained statistician.