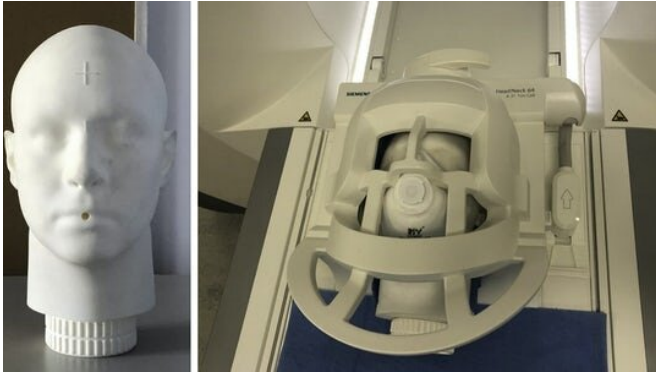


Face masks unsafe in MRI machines, study shows

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Credit: Cardiff University

Certain types of face masks are unsafe for wearing in and around MRI machines, according to new research by scientists at Cardiff University.

The team tested eight different types of commercially available filtering face piece (FFP3) respirators and found that five contained magnetic components that they regarded as "MRI unsafe."

Many masks contain metal nose strips or clips to help shape the mask over the nose or metal staples to hold the elastic straps in place. Some masks also have an antimicrobial coating containing typically silver or copper.

When reacting with the huge magnets inside an MRI machine, the metals components can cause a number of complications, including the displacement of the mask, the risk of the metal components flying off, or potentially burning the patient.

There has already been one incident reported in the U.S. where a patient reported a face mask burn while undergoing an MRI scan.

Furthermore, metal components can also cause artifacts to appear on a scan which can, in some cases, make the scans unusable.

In the absence of any official guidance around the wearing of masks in and around MRI machines, the team recommend a color coded system to distinguish between "MRI safe" masks and the ones that a patient may be wearing to their appointment on the day.

In their study, the team performed three MRI scans on a 3D printed model of a head and neck which was fitted with eight commercially available FFP3 masks.

The safety of each mask was based on the presence of ferromagnetic material components, the presence of metallic material, a measurable deflection at the bore of the MRI machine, and a temperature measurement greater than 40°C during testing.

The team found that five of the eight masks contained ferromagnetic components and were thus classified as "MRI unsafe."

Two masks were deemed "MRI safe" whilst one was deemed "MRI conditional" due to the potential risk of local heating under certain conditions within the MRI machine.

"At present there is no safety documentation surrounding the wearing of face masks in and around an MRI machine so [hospital staff](#) are unaware of the potential hazards that masks could pose," said lead author of the study Dr. Bethany Keenan, from Cardiff University's School of Engineering.

"It is therefore extremely important to not assume that a mask is safe prior to an MRI examination, and to conduct a safety evaluation to determine which components are made of ferromagnetic

metals and which are non-ferromagnetic [metal](#).

"We suggest that where possible, surgical [masks](#) should be ordered in a separate color to distinguish between an 'MRI safe' and an 'MRI unsafe' surgical mask."

The study was published in the journal *Clinical Radiology*.

More information: B.E. Keenan et al, MRI safety, imaging artefacts, and grid distortion evaluated for FFP3 respiratory masks worn throughout the COVID-19 pandemic, *Clinical Radiology* (2022).
[DOI: 10.1016/j.crad.2022.05.001](https://doi.org/10.1016/j.crad.2022.05.001)

Provided by Cardiff University

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