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# A disposable diaper in an N95 respirator

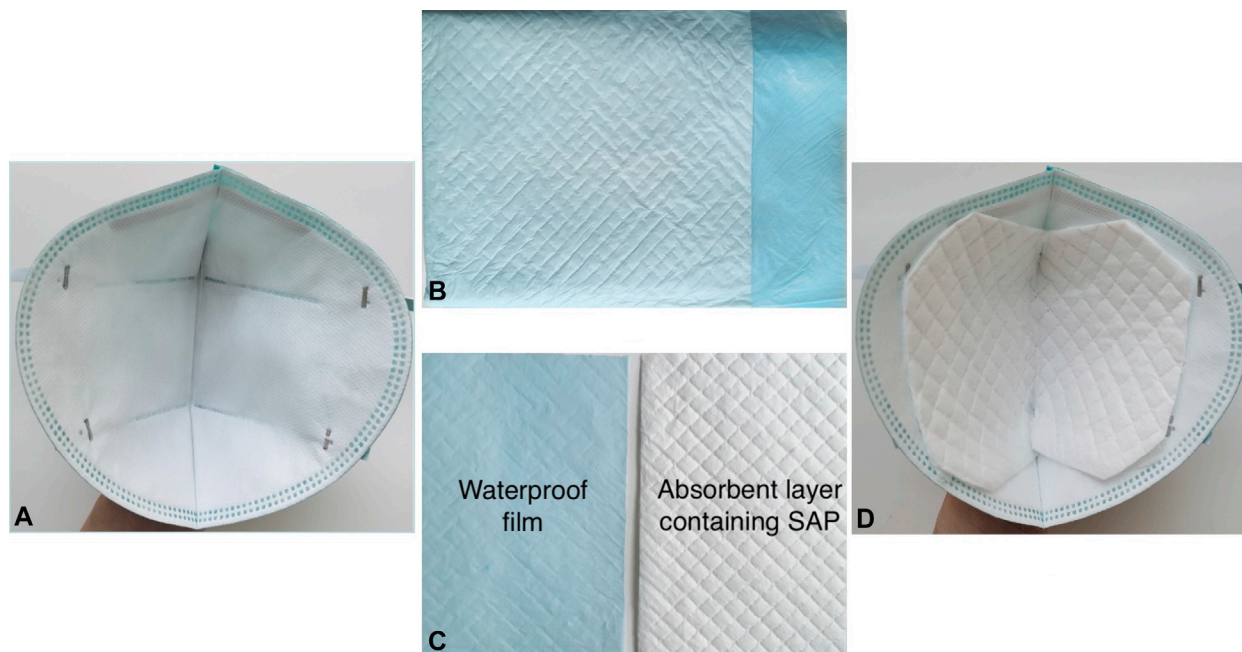


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**Key words:** COVID-19; N95 respirator; SAP.

## THERAPEUTIC CHALLENGE

During the ongoing pandemic of COVID-19, the shortage of protective respirators has become a major problem, and feasible methods that help prolong the life cycle and reusability of respirators are critical. In addition, the comfort properties of respirators are of great importance and may affect health care workers' compliance with wearing them. However, the protective masks available generally lack reasonable comfort for wearers.



**Fig 1.** A step-by-step description for making an N95 respirator with an SAP pad. **A**, An N95 respirator. **B**, An incontinence pad. **C**, The separated incontinence pad. **D**, A shaped SAP pad placed inside the respirator. *SAP*, Superabsorbent polymer.

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**Solution**

Superabsorbent polymer (SAP), a harmless material capable of absorbing and retaining large amounts of liquid relative to its own weight,<sup>1</sup> is easily obtainable by cutting off the absorbent layer of everyday items and hospital supplies (eg, a disposable diaper, sanitary napkin, or incontinence pad). An N95 respirator with an SAP pad could rapidly absorb sweat, water vapor, and exhaled splutter, but the SAP pad itself gets wet very slowly, which greatly reduces the humidity of respirators during wearing, leading to longer life cycle and improved comfort.<sup>2</sup> First, get an incontinence pad and peel off its waterproof film to get the absorbent layer containing SAP (the SAP pad). Next, cut the SAP pad into the proper shape and size that fit the respirator well. Finally, place the SAP pad on the inside of the respirator (Fig 1).

From our experience, a single SAP pad is thin enough to maintain the protectivity of respirators; it can be used much longer (>4 hours) without getting wet or dropping off and mildly decreases the air permeability compared with other solutions, such as using a paper towel or cotton pad.

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