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JEM is a co-founder of International Physicians for Prevention of Nuclear War, the organisation awarded the 1985 Nobel Peace Prize. DGN is a co-founder of Physicians for Social Responsibility. We declare no competing interests.

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Gendered effects of school closures during the COVID-19 pandemic

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Governments worldwide have implemented school closures as a preventive measure to the spread of COVID-19. According to UNESCO, school closures have sent about 90% of all students out of school, among them more than 800 million girls. A substantial number of these girls live in the world's least developed countries where getting an education is already a struggle. We agree with Hall and colleagues¹ who recognise girls as a vulnerable group in the COVID-19 pandemic, stress two issues hindering girls' education in developing countries, and challenge progress and commitment toward gender equality, girl empowerment, and the Sustainable Development Goals.

The first issue relates to sexual and reproductive health aspects, where teenage girls might disproportionately drop out of school due to an increased risk of sexual exploitation, pregnancy, and (forced) marriage. School closures during the Ebola outbreak were associated with an increase in teenage pregnancies.² Once schools re-opened, many “visibly pregnant girls”² were banned from going back to school. With schools closing throughout the developing world, where stigma around teenage pregnancies prevails, we will probably see an increase in drop-out rates as teenage girls become pregnant or married.

The second issue relates to socioeconomic aspects, where girls might spend less time studying or might drop out of school at higher rates than boys because of a disproportionate increase in unpaid household work. Girls aged 5–14 years already spend 40% more time doing household work than boys do.³ As girls stay at home because of school closures, their household work burdens might increase, resulting in girls spending more time helping out at home instead of studying. This might encourage parents, particularly those putting a lower value on girls' education, to keep their daughters at home even after schools reopen. Moreover, research shows that girls risk dropping out of school when caregivers are missing from the household because they typically have to (partly) replace the work done by the missing caregiver,⁴ who might be away due to COVID-19-related work, illness, or death. Therefore, with the current COVID-19 pandemic, we might see more girls than boys helping at home, lagging behind with studying, and dropping out of school.

We warn that school closures in this COVID-19 pandemic may bolster gender gaps in education and girl empowerment dampening any progress already made, particularly in developing countries. We call for public acknowledgment and discussion about the adverse effects school closures can have on widening of the schooling gap

between girls and boys. We call for a gendered perspective in developing policy responses by tackling the sexual and reproductive health and socioeconomic issues addressed here to bring girls back to school after the measures to contain the COVID-19 pandemic end. We also ask governments to collect data specifically on non-paid housework and childcare responsibilities frequently ignored when investigating the consequences of child labour. Addressing the health and socioeconomic issues girls might face during this pandemic, as well as collecting data to quantify their effects, are important in honouring the commitment to the Sustainable Development Goals.

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Challenges for the female academic during the COVID-19 pandemic

Science and innovation benefit from diversity. However, as the global community fights COVID-19, the productivity and scientific output of female academics are disproportionately affected, leading to loss of women's scientific expertise from the public realm.

Women comprise 70% of the global health workforce and more than 50% of medical graduates in many countries. Despite this, women and gender minorities remain underrepresented in medical leadership. Only 22% of full professors in American medical schools¹ and 23% in Europe² are women. Women of colour are particularly underrepresented; only 0.5% of full professors in American medical schools are Black women.¹ Academic publishing is essential to career advancement. Women's first authorship in major medical journals has increased from 27% to 37% (1994–2014).³ Yet, COVID-19 is threatening progress by amplifying existing gender disparities.

Early data show that COVID-19 significantly affects women's publishing. Andersen and colleagues⁴ compared authorship of 1179 medical COVID-19 papers with 37 531 papers from the same journals in 2019. At 30%, 28%, and 22%, women's shares of overall, first, and last authorship in COVID-19 papers decreased by 16%, 23%, and 16%, respectively. In a Github analysis of arXiv and bioRxiv submissions, Frederickson⁵ showed that, although preprint submissions are increasing overall, the number of male authors is growing faster than the number of female authors. Female authorship in other research fields shows similar trends.⁶ Our analysis of COVID-19 papers in *The Lancet* (n=159), excluding Editorials, World Reports, and Perspectives, indicates that overall, first, last, and corresponding female authorship was 30.8%, 24.4%, 25.8%, and 22.9% respectively. Furthermore, most authorships (61.3%) were affiliated with institutions in high-income countries and with the European and central Asia region (40.2%; further methods and details are described in the appendix). Overall female authorship of COVID-19 research articles (32.9%) is similar to previously reported authorship (29%, 2016–17), but overall female authorship of COVID-19 comments (30.6%) is

lower than previously reported (39%, 2018).⁷

Increasing the prominence of women and minorities in academia is crucial to the fight against COVID-19. Furthermore, ensuring that women's academic output is not disproportionately affected by COVID-19 might safeguard women's career trajectories. Challenges women in academia face are well documented in non-pandemic times. These challenges include male-dominated institutional cultures, lack of female mentors, competing family responsibilities due to gendered domestic labour, and implicit and subconscious biases in recruitment, research allocation, outcome of peer review, and number of citations.⁸ COVID-19 has led to unprecedented day care, school, and workplace closures exacerbating challenges. Recent data from the USA, the UK, and Germany suggest women spend more time on pandemic-era childcare and home schooling than men do.⁹ This is particularly difficult for single-parent households, the majority of which are female-headed.

The academic community, funders, and health professionals should support women in academia during this pandemic (and beyond). First, recognise that women are probably taking on more responsibilities than men are. Help families access safe childcare, and provide options for academics caring for family members, by considering the lockdown period as care leave so decreases in productivity do not hinder later career advancement. Second, recognise how gender bias influences selection and evaluation of scientific experts and leaders during times of crisis. Women make up just 24% of COVID-19 experts quoted in the media and 24.3% of national task forces analysed (n=24).¹⁰ However, countries with female leaders have some of the best COVID-19 outcomes.¹¹ Amplify the voices of women with established records in infectious disease, pandemic response, global health, and health security. Third,

collect and report institutional data on gender representation, including academic output and senior positions. Set clear, specific goals and guidelines and be proactive about identifying and addressing evidence on the impact of COVID-19. Give credit for ideas and ensure that first and last authorship is shared equitably and that contributions are acknowledged fairly among colleagues. Fourth, identify and address structural implicit and unconscious biases in research institutions (eg, hiring) and publication processes (eg, peer review outcome, number of citations). Consider offering training in bias or double-blinded peer review for scientific journals. Establish accountability mechanisms to ensure professionalism and report concerns. Finally, and most importantly, recognise that women from ethnic minority groups face additional challenges in academia, and take structural action to provide support and address these challenges.

Scientific expertise and knowledge from all genders are essential to build diverse, inclusive research organisations and improve rigour of medical research to tackle COVID-19. We can do better.

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See Online for appendix

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Overcoming fragmentation of health research in Europe: lessons from COVID-19

We face an unprecedented crisis in our interconnected world where health and wellbeing, security, and economy affect populations across borders. Individual and societal health is valued widely, with care for the planet and health top priorities for European citizens. Europe's answer to COVID-19 comes with long-term geopolitical and economic consequences and, in this intense spotlight, EU health policy weaknesses are starkly apparent.

The EU's focus has always been the economy: health and health care

are not primary competences. For this reason, the COVID-19 response has suffered intensely from a lack of coordination and consequent inequity in access to care. The health and economic crisis has been a wake-up call. On May 27, 2020, the European Commission (EC) presented its recovery plan, Europe4Health, integrated in the proposal for the next Multiannual Financial Framework 2021–27. Although the economy is still the primary focus, EU initiatives for health and health care are prominent.

Health research is a gateway to better health, and it is an EU competence. EU framework programmes and initiatives have shown the power and impact of research collaborations that cross borders and sectors. In response to COVID-19, substantial research funding was quickly made available. However, most initiatives remain with member states who provide more than 85% of total spending for publicly funded research. European funding policy, by contrast with policies from other

large regions,¹ is fragmented through lack of continuity and coordination, within the EU and between EU and member states. This threatens the quality of health research, health care, crisis responsiveness, and EU health innovation competitiveness. Research for health should not be hampered by programme boundaries between basic research, innovation, implementation in treatment, and diagnosis and prevention; evaluation of cost-effectiveness and ensuring an affordable health-care system across Europe are an integral part of health research. The COVID-19 pandemic painfully highlights the need for a pan-European coordinated approach in crucial areas of research including data collection and access, diagnostics implementation, and strategy for the development of innovative treatments. Even if the next framework programme, Horizon Europe, takes an inspiring step in aligning health research across EC directorates, more is needed.

The new EU policies under discussion should look beyond crisis

Panel: Aims and recommendations in four strategic areas for Europe

Focus on healthy life, wellbeing, and public health

- Promote health, implement public health, and innovate health-care systems
- Convergence of social and behavioural sciences, epidemiology, environmental research, and digital innovation
- Cross-sectoral collaboration for pan-European policies for public health

Investment in translational research

- Secure a pipeline of ideas to reach the stage of implementation
- Invest in research on health-care organisation, outcomes, financing models, and attrition of ineffective treatments for affordable health care

Capacity building

- Reduce unacceptable health inequalities across Europe
- An adequately trained workforce for health research, translation, and innovation in health care, placing patients and citizens at the centre
- Pan-European infrastructures for digitalisation and artificial intelligence

Partnerships

- A European strategy to ensure bundling of activities, including national research themes where appropriate, between academic and industrial research
- Associated countries and a post-Brexit UK must be partners when setting out a long-term health plan

More details on these recommendations are available in the appendix.

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