



A woman receives a dose of Pfizer-BioNTech COVID-19 vaccine in Skåne County, Sweden.

ETHICS

Cash incentives, ethics, and COVID-19 vaccination

We can pay people to vaccinate, but should we?

By Nancy S. Jecker

Monetary incentives to increase COVID-19 vaccinations are widely used. Do they work? Studies suggest that payments were successfully used to increase vaccination for human papillomavirus in England (1), hepatitis B in the United States and United Kingdom (2), and tetanus toxoid in Nigeria (3). However, little is known about the effect of direct payment or lotteries on COVID-19 vaccination rates. On page 879 of this issue, a new study by Campos-Mercade *et al.* (4) shows that monetary incentives changed behavior and increased vaccination in a large group. Yet ethicists hold a range of views about whether we should pay people to vaccinate.

Serbia was the first to adopt payments for COVID-19 vaccinations, announcing a \$30 reward (about 5% of the average monthly salary) in May 2021. That same month, vaccinated Hong Kongers became eligible to enter a lottery for a one-bedroom apartment worth \$1.4 million and cash prizes totaling \$12,890. In July 2021, US President Biden endorsed financial incentives, as did many US states.

Two studies in the United States suggested that using cash to increase COVID-19 vaccination rates might be effective (5, 6), but they relied on self-reports without actually

paying people and observing effects. Another US study detected no significant association between lottery announcements and vaccine uptake (7). Against this backdrop, Campos-Mercade *et al.* provide much needed insight. They report the results of a randomized controlled trial of unvaccinated people in Sweden ($N = 8286$) that paid people \$24 if they vaccinated within 30 days. They found that vaccination increased 4.2%. No significant group differences emerged based on age, education, race or ethnicity, or income.

Yet questions remain. It is unclear whether participants who vaccinated would have done so eventually, without rewards, or whether paying more would increase vaccination or trigger suspicion and backfire. Research is needed to determine the study's generalizability. Would \$24 work in the United States, where 12% of the adult population reported that they would get vaccinated only if required (8)? Would it change behavior in sub-Saharan Africa, where 60% of those who would reject the vaccine believe that it is less safe than other vaccines and nearly half think that COVID-19 was planned by foreign actors (9)?

WE CAN PAY, BUT SHOULD WE?

Even if it is possible to increase vaccination through cash payments, whether such payments are ethical is a contested issue. Several key issues arise in these debates.

Utility. Arguments defending monetary incentives often appeal to utilitarian principles,

claiming that we should use whatever saves the most lives. For example, if education, encouragement, and facilitation fail, a payment-for-risk model is warranted (10). One counterargument is that narrowly focusing on saving lives may not be defensible given other urgent goals, like equity. Even if the sole end were saving lives, other means, such as mandates, may yield higher vaccination rates and save more lives.

Liberty. Another defense of monetary incentives puts a premium on minimizing intrusions into people's lives and argues that monetary incentives are the least intrusive method to increase vaccination. One rebuttal is that other measures may work as well and restrict liberty less. For example, conversations with community leaders are less invasive and may work for undocumented immigrants who are concerned about deportation or Catholics who are troubled by fetal cell lines used in vaccine development.

Civic responsibility. Another defense of monetary incentives maintains that they cultivate civic responsibility by rewarding good behavior. A counterargument is that monetary incentives encourage people to do things for money, not to be virtuous citizens. Historically, antivaccinators consistently invoked citizenship to defend their own view, interpreting "good citizenship" to mean honoring diverse views and respecting the bodies of neighbors (11).

Equity. Arguments against cash incentives point to unequal effects on different segments of society (12). For example, a \$100 cash incentive may not feel coercive to prosperous people, yet it might to people who lost jobs during the pandemic. A rejoinder is that it increases equality to pay people who are financially struggling. Yet such a one-time modest payment is unlikely to make a lasting difference in the lives of marginalized people. Another reply is that cash incentives increase equity by reducing infections in hard-hit groups. But this can be done without leveraging economic hardship to increase vaccination.

Exploitation. Opponents of monetary incentives argue that they might be exploitive, "taking advantage of [people] who have lost jobs, experienced food and housing insecurity, or slipped into poverty" (13). Although some counter that cash inducements are not exploitive because they encourage a less risky choice (vaccination) (14), this misses the mark. What makes a transaction exploitive is

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not its beneficial or harmful effects, but the nature of the transaction itself. Exploitive transactions use a person's vulnerability to achieve someone else's goals.

Autonomy. Other opponents argue that substituting cash for conversation insults the autonomy of vaccine refusers, signaling that their decisions can be bought. With lotteries, cash awards can manipulate decisions by leveraging cognitive biases, such as “probability neglect,” which leads people to irrationally interpret probabilities in their favor (15). Defenders of monetary incentives might reply that it is paternalistic to assume that people offered cash cannot decide for themselves. Even if excessive payment or high-stakes lotteries unduly induce people to participate, modest cash awards do not. We also routinely pay people in other settings—for example, for research participation. In reply, safeguarding autonomy calls for mitigating cognitive biases, not manipulating them. Even modest cash awards could unduly induce the least well-off to take part. The purpose of paying research subjects is compensating time and expenses, not inducing participation.

PROCEED WITH CAUTION

Policy-makers considering payment for vaccination should proceed with caution. Cash payments in Sweden may face fewer equity concerns than they do in low-income countries or for countries with meager safety nets and income inequality. In the United States, for example, cash incentives may be more exploitive and manipulative, and race-related differences in wealth could compound this effect for some minorities. Whether monetary incentives for vaccination are ethically sound or morally dubious may depend on the setting to which they are applied. ■

REFERENCES AND NOTES

1. E. Mantzari *et al.*, *Health Psychol.* **34**, 160 (2015).
2. S. Tressler, R. Bhandari, *Open Forum Infect. Dis.* **6**, ofz521 (2019).
3. R. Sato, B. Fintan, *Hum. Vaccin. Immunother.* **16**, 1181 (2020).
4. P. Campos-Mercade *et al.*, *Science* **374**, 879 (2021).
5. L. Vavreck, “\$100 as incentive to get a shot? Experiment suggests it can pay off,” *New York Times*, 4 May 2021.
6. C. Robertson *et al.*, *J. Law Biosci.* **8**, Isab027 (2021).
7. D. Dave *et al.*, *JAMA Health Forum* **2**, e213117 (2021).
8. L. Hamel *et al.*, KFF Covid-19 vaccine monitor: September 2021, Kaiser Family Foundation, 28 September 2021; <https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-september-2021/>.
9. Africa CDC, COVID 19 vaccine perceptions: A 15 country study, February 2021; <https://africacdc.org/download/covid-19-vaccine-perceptions-a-15-country-study/>.
10. J. Savulescu, J. Pugh, D. Wilkinson, *Nat. Med.* **27**, 1500 (2021).
11. N. Durbach, *Bodily Matters: The Anti-Vaccination Movement in England, 1853–1907* (Duke Univ. Press, 2004).
12. N. S. Jecker, *J. Med. Ethics* **10**, 1136/medethics-2021-107235 (2021).
13. E. A. Largent, F. G. Miller, *JAMA* **325**, 534 (2021).
14. G. Persad, E. J. Emanuel, *JAMA* **326**, 221 (2021).
15. A. Oza, *Science* **373**, 611 (2021).

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GEOLOGY

Perovskite retrieved from the lower mantle

The calcium silicate compound was characterized and named as “davemaoite”

By **Yingwei Fei**

No one has ever successfully retrieved a high-pressure calcium silicate from the lower mantle before. This is because the high-pressure CaSiO_3 -perovskite is “unquenchable,” meaning that it cannot retain its structure after being removed from its high-pressure environment. On page 891 of this issue, Tschauer *et al.* (1) report the first-ever silicate obtained from Earth's lower mantle. They have coined the crystalline compound “davemaoite.” The sample is a CaSiO_3 -perovskite trapped inside of a diamond from the lower mantle. The authors provide definitive evidence for a structurally preserved cubic CaSiO_3 -perovskite by means of synchrotron x-ray diffraction.

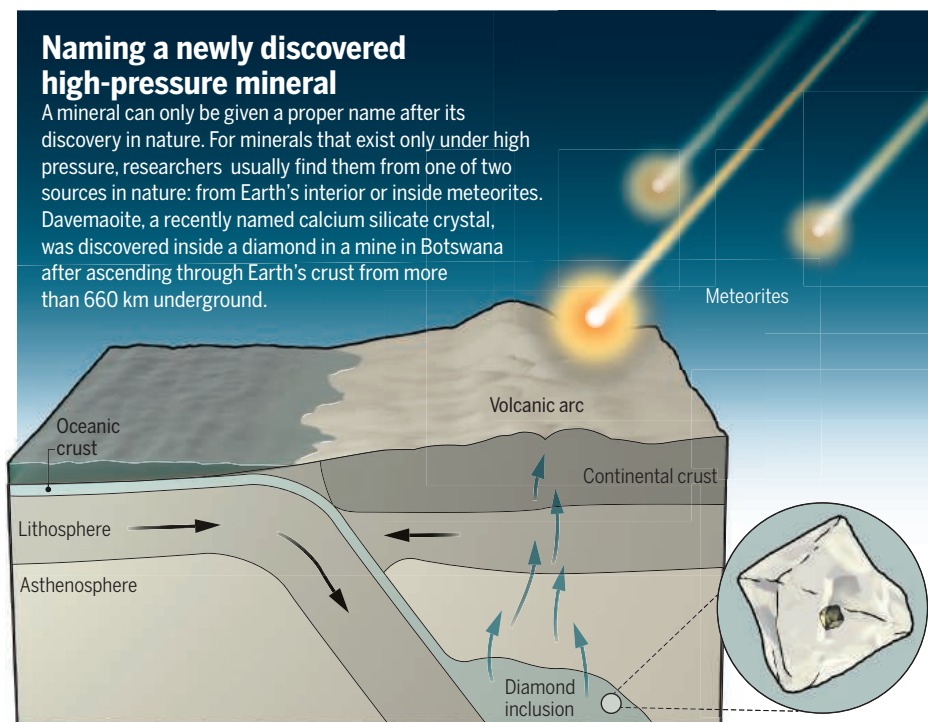
The possibility that a high-pressure phase of CaSiO_3 might exist in the lower mantle was first suggested in 1967 in a

study of CaSiO_3 - CaGeO_3 perovskite-type solid solution (2). In 1975, scientists successfully synthesized the CaSiO_3 -perovskite high-pressure phase with a cubic structure by using a laser-heated diamond anvil cell (3). Because of the unquenchable nature of the CaSiO_3 -perovskite phase, its structure has never been fully refined with single-crystal x-ray diffraction, but powder x-ray diffraction data are broadly consistent with either a cubic perovskite structure (3, 4) or tetragonal symmetry, with very small differences between its long and short axis (5, 6). The natural sample obtained by Tschauer *et al.* shows an x-ray diffraction pattern consistent with that of the synthetic CaSiO_3 -perovskite high-pressure phase. Named after Dave Mao (also known as Ho-kwang Mao), an experimental geophysicist who contributed to high-pressure research over the past 50 years, davemaoite was approved as a new natural mineral by the Commission of New Minerals, Nomenclature, and Classification of the International Mineralogical Association.

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Naming a newly discovered high-pressure mineral

A mineral can only be given a proper name after its discovery in nature. For minerals that exist only under high pressure, researchers usually find them from one of two sources in nature: from Earth's interior or inside meteorites. Davemaoite, a recently named calcium silicate crystal, was discovered inside a diamond in a mine in Botswana after ascending through Earth's crust from more than 660 km underground.



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