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How can we improve self-isolation and quarantine for covid-19?

Jay Patel and colleagues examine international approaches and argue for comprehensive support initiatives driven by local government and community based teams

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A consistent lesson from the covid-19 pandemic is the importance of a functional test, trace, isolate, and support system.¹² The ability of people to isolate is foundational to this multipronged strategy, as it breaks chains of transmission and reduces infection rates in a population. Even the most effective mass testing and intense contact tracing systems have only marginal value if people who test positive and their close contacts are unable or unwilling to self-isolate. Given the global rise in cases of covid-19 and emergence of new variants effective isolation remains critical to controlling the pandemic. We examined the approaches to supporting and monitoring isolation in countries with available data to help understand what works. Data sources included government reports and websites, peer reviewed articles, preprints, and news media reports.

Self-isolation rates

The limited evidence available suggests adherence to self-isolation is generally low, and both financial and logistical factors determine an individual's ability to isolate.³ A series of online surveys conducted in the UK with over 30 000 participants found that only 18% of those who had experienced symptoms in the past seven days had not left home since developing symptoms, and only 11% of close contacts quarantined.³ These figures are far from the stated public intention to self-isolate and quarantine, at around 70% and 65%, respectively.³ Commonly cited reasons for failure to isolate or quarantine include childcare responsibilities, experience of pandemic hardship, low awareness of covid-19 guidance, and working in a key sector.

Self-reported ability to isolate was lower among ethnic minority groups and those with annual household incomes below £20 000 (€23 000; \$27 000) or savings of less than £100.⁴ Interim evaluation from the Liverpool covid-19 community testing pilot concluded that a major barrier to testing uptake—mostly in deprived communities—was the fear of not having adequate support to isolate.⁵ Similarly in Iran, although the ability to adhere did not follow the social gradient, people who considered themselves of lower social class were less likely to

comply with social isolation measures because of a perceived lack of social support.⁶

The reason for the difference between intent and actual practice of self-isolation is relevant in predicting compliance. In particular, people who have symptoms or positive results are more likely to isolate than their contacts.⁷⁸ In the Netherlands, public intention to isolate at home was around 95% if they were to receive a positive test result, reducing to 84% if a member of their household had tested positive, and 43% if a close contact had covid-19.7 A Norwegian study found that 65% of people required to self-isolate had not done so, but compliance was significantly higher among people with symptoms than among those who were asymptomatic. Public adherence to protective behaviours in the pandemic has been high, and for behaviours where it is lower--as in self-isolation--the intention to adhere is high, suggesting adequate support could help enable these behaviours.9

Public trust in institutions is a key determinant of compliance to public health guidelines, especially in times of crisis. ¹⁰ The west African response to the 2014 Ebola epidemic showed that mobilising local leaders and promoting community engagement helped build trust and improved the success of public health measures. ¹¹ In the UK, longitudinal analysis confirmed a relation between trust in government and intention to follow covid-19 guidelines, ¹² although similar analyses on reported behaviours are currently lacking.

Support measures

We use "support" to refer to financial or other measures that enable people to follow self-isolation or quarantine guidance for the stipulated period. Most of the countries we studied have mandatory isolation periods for covid-19 of 10 to 14 days, with France (7 days and voluntary) and Vietnam (21 days and mandatory) notable exceptions (table 1). The support packages offered across countries can be divided into four types: financial support, employment benefits, practical support, and comprehensive services.

Table 1 Summary of support and enforcement for isolation and quarantine policies for covid-19 in 20 countries*								
Country	Self-isolation guidance	Eligibility for support	Available support	Enforcement and monitoring	Penalties for violation			
Australia	Mandatory self-isolation for 14 days	Anyone who has to isolate and does not have paid sick leave or government income support	Employees in Victoria can apply for a £250 (A\$450) test isolation payment to support self-isolation while waiting for test results, and £820 if income is lost while isolating as a confirmed case or close contact. £170 available in South Australia	Public health staff can monitor through telephone checks. Isolation in designated facilities may be required if people breach rules. Periodic checks by police officers	£2800 in Victoria. Up to £6000 (with a further £3000 fine for each day the offence continues) or 6 months in prison in New South Wales. Up £7200 in Queensland			
Belgium	7 days for people testing positive (including 3 days without symptoms) and 10 days for close contacts or 7 days with a negative test	Employed people required to isolate	70% of earnings up to £2300 (€2755) a month and a nominal allowance of £130 a month	Spot checks by public health staff	Fine of £200 rising to £3400 for serious or repeat offences			
Canada	Voluntary self-isolation for 14 days	Missed at least 50% of work week because of instruction to self-isolate	Income support of £250 (C\$450) a week through the Canada recovery sickness benefit, for up to two weeks	Public health agencies are responsible for monitoring isolation by conducting spot checks	Repay Canada recovery sickness benefit. Fine of up to £2850 a day			
Denmark	Mandatory self-isolation for 14 days	Individuals unable to self-isolate at home	Voluntary quarantine facility offered (exclusive of food)	Random physical checks or phone calls	Fine of £400 (Kr3500)			
Finland	At least 10 days since symptom onset and 48 hours after symptoms have resolved	Employees that have suffered financial loss because of self-isolation and cannot isolate at home	100% of lost income during isolation period. Alternative accommodation provided if required	Official quarantine and self-quarantine are not monitored. Police can investigate if violation has been reported	Fine depending on annual income, or up to 3 months' imprisonment			
France	Voluntary self-isolation for 7 days	Employed people required to isolate	90% of gross salary reimbursed plus daily allowance (50% of daily basic wage for 30 days). Health teams can offer home visits, providing practical and support	Occasional home visits by public health officials	No penalties			
Germany	Mandatory self-isolation for 10 days	Employed people required to isolate	Employees who test positive are entitled to 100% remuneration of their salary (for up to six weeks), after which statutory sick pay of 70% applies	Containment scouts can conduct phone checks or home visits	Fine of up to £20 000 dependent on monthly income and location), or up to 5 years in prison			
Israel	Mandatory self-isolation for 10 days and until a certificate of recovery is issued	Employed people required to isolate	Isolation benefit, equivalent to sick pay, but standard deduction applies. No more than 4 days sick days will be deducted for each isolation duration	Police and Ministry of Health inspectors perform checks	Fine of up to £100 and potential imprisonment			
Italy	Mandatory self-isolation for 10 days	Unclear. Italian officials determined that isolating people in dedicated facilities is not feasible	Statutory sick pay at 50% of daily salary applies. Daily phone calls from a public health professional for a small minority of people	Public health operators monitor cases through telephone checks. Geolocation data used to monitor movement	Fines of £430-£4300 with risk of 3-18 months' imprisonment			
Japan	Voluntary self-isolation for 14 days either at home or in designated facilities	Any employed and insured person who has to self-isolate	Sickness allowance equal to two thirds of their average daily wage over past 12 months	No monitoring	No penalties for refusing to self-isolate			
Netherlands	Voluntary self-isolation for 10 days	Anyone who has experienced financial loss because of self-isolation	Temporary self-employment income support and loan scheme. Local municipality and Red Cross can offer practical support and alternative accommodation	Police and special investigating officers can enforce fines. Public health messaging around morals and self-discipline used to maximise compliance	Fine of £80			
New Zealand	Mandatory self-isolation for 14 days	Must have been told to self-isolate by a health official	Employees paid £300 (NZ\$585) a week of full time work (>20 hours/week) and £180 for part time work (<20 hours/week) for two weeks. A one-time payment of £300 is available for workers who are self-isolating while awaiting test results	Medical officials with the help of police	Under the Covid-19 Public Health Response Act 2020, either 6 months imprisonment or a £2000 fine			

Table 1 | Summary of support and enforcement for isolation and quarantine policies for covid-19 in 20 countries* (Continued)

Country	Self-isolation guidance	Eligibility for support	Available support	Enforcement and monitoring	Penalties for violation
Norway	Mandatory self-isolation for 10 days	Employed people required to isolate. Accommodation provided for people who cannot isolate at home	Statutory sick pay: 80% of salary up to annual salary cap of £50 000 (Kr600 000). Local municipality can cover the cost of alternative accommodation if necessary	Police checks	Fine of £1600 and up to 15 days' imprisonment
Singapore	Mandatory self-isolation or quarantine for 14 days	Any person required to quarantine eligible for sick pay	Employed residents receive paid sick leave plus £40 (\$75) daily compensation. Unemployed residents can contact agents for social and financial assistance. Daily compensation of £40 available to self-employed citizens, permanent residents, or workpass holders	The Ministry of Health will establish if a quarantine order should be served in the home or in dedicated government facilities. Individuals monitored by video calls or mobile apps at least three times daily, along with spot checks	People who do not quarantine properly may have to wear ar electronic tag or receive an order to be detained and isolated in a hospital or other suitable facility. Violation risks prosecution under Section 214 of the Infectious Disease Act
Slovakia	Mandatory self-isolation for minimum 14 days	People unable to self-isolate at home	State run quarantine facilities available if home isolation is not possible	Installation of the eQuarantine mobile app is mandatory for home isolation, providing location based tracking and random facial recognition requests	Fine of up to £1400
Spain	Mandatory self-isolation for 10 days	Employed people required to isolate	Employed people entitled to a benefit in addition to a dedicated sickness benefit, of 60% salary up to 15 days	Random physical checks or phone calls	Fine of £2500 rising to £500 000 for repeat offences
South Korea	Mandatory quarantine for 14 days	Any person required to quarantine	Quarantined individuals are provided with daily necessities and sanitary kits (valued at £40) and financial support of £270 a month	Mobile app or twice daily telephone calls, plus random checks by public health workers	Fine of up to 10 million Korear won (£6000) in fines, a so called "1-strike out policy"
Taiwan	Mandatory self-isolation for 14 days	Any person required to quarantine	Daily compensation of £25 (NT\$1000). Local centres provide support services, daily follow-up calls, transport, medical care, household services, accommodation for people without a residence, and food delivery	Twice daily checks by local health agencies. Additionally, a mobile app uses location tracking and geofencing	Fine of up to £3800
Sweden	Voluntary personal responsibility to stay at home	Medical certificate required to confirm diagnosis of covid-19	Salary paid if infected person cannot work. Sick pay for anyone considered ill. Infected people who are still able to work are supported through the disease carrier allowance	No monitoring	No penalties
United Kingdom	Mandatory self-isolation for 10 days and 14 days for close contacts	Low income groups, including those receiving government benefits	£500 each time someone is required to isolate. Local authorities may provide practical support for vulnerable people	NHS Test and Trace call handlers make follow-up calls to those isolating. Police checks can be conducted in high incidence areas. Employers have responsibilities to ensure their staff observe self-isolation guidelines	Fine of £1000 rising to £10 000 for repeat offences in England, £480 in Scotland, and up to £1000 in Wales

Financial support—Some countries offer one-off payments to people who test positive for covid-19 and their contacts to self-isolate. Among the most generous are Australia (up to A\$1500 (£840; €970; \$1200)), UK (£500 for those receiving government income support), and South Korea (£270). Taiwan offers £25 for each day spent in isolation to cases and their care givers. ¹³ The UK restricts payments to those who receive government benefits, whereas Singapore, South Korea, and Taiwan extend financial support to everyone required to isolate.

Employment benefits—These are commonly paid to those having to isolate, often alongside nominal allowances. Generally, these benefits can only be obtained by people who are employed or earn above a specified income level. In the UK, around two million low paid workers are not entitled to statutory sick pay of £95.85 a week.¹⁴

Practical support can take the form of home visits or help with food, medication, and alternative accommodation. The French government mobilised health teams to conduct home visits for

confirmed cases, advising them to self-isolate, offering antigen (rapid) tests for household members, and providing extra practical support. ¹⁵ In the Netherlands, those isolating can contact local municipalities and the Red Cross for practical help. Providing accommodation is particularly important given the heightened risk of household transmission and difficulties of isolating when living in large, crowded, and multigenerational households. ¹⁶ In Denmark and Norway, local governments offer accommodation to anyone unable to isolate at home. In the US state of Vermont, housing policies enabling people to safely isolate from household members were considered central to its response. ¹⁷ This involved strengthening existing infrastructure to provide comprehensive housing protection for vulnerable communities.

Comprehensive support—Local authorities in South Korea, Taiwan, New York (box 1), and San Francisco (box 2) offer comprehensive support for self-isolation. In South Korea, as well as one-off payments, people in quarantine are provided with daily necessities and sanitary kits worth around £40 and quarantine facilities if they cannot isolate at home. In Taiwan, local government centres offer transport arrangements, food delivery, medical care and household services, including accommodation for people without a residence. San Francisco's "right to recover" programme provides eligible workers with two weeks of salary reimbursement at the minimum wage (\$1285; £930; €1000), practical support, and alternative accommodation if required. 22

Box 1: New York City's "take care" initiative

The take care initiative aims to provide any resources an individual requires to safely observe their full self-isolation period either in a hotel or at home. ¹⁸ This initiative is coordinated locally, with "resource navigators" from community organisations delivering a wide range of services, including financial help, food delivery, health insurance, medical kits, pet care, and mental health support across every neighbourhood. The support package has high acceptance, with only 2% refusing assistance. Preliminary findings showed that local contact tracers were able to locate 82-87% of people at home during random monitoring visits (personal communication). Even among those who left their homes multiple times a day before symptom onset or a positive test result, around 90% reported not leaving their home during the self-isolation period. This figure is increasing as the initiative continues to strengthen, and adherence may be as high as 95%. ¹⁹

Box 2: San Francisco's "test-to-care" initiative

The test-to-care model involves engaging with community members and local public health leaders in a densely populated and predominantly Latin American neighbourhood of San Francisco, California. This model, designed to support vulnerable, low income populations, has three support strands: information services, practical services (such as groceries, medication, hygiene products, and other necessities) and ongoing medical, social, and emotional support. Support is delivered by healthcare providers and community health workers. Although its evaluation did not directly assess rates of isolation and quarantine, 65% of participants received community support for the duration of the self-isolation period. ²⁰ In addition, around 1 in 10 participants disclosed more contacts than at the initial contact tracing interview. ²⁰

Monitoring self-isolation

Broadly, two mechanisms for monitoring isolation have been used with varying degrees of stringency: regular or random checks conducted in person or by telephone, and digital surveillance technologies. Checks are coordinated by local public health authorities or private sector staff and supported by the police. To be allowed to isolate at home in Slovakia, people must install a mobile phone app that carries out random facial recognition checks

and provides tracking information. Australia, Singapore, South Korea, and Taiwan also conduct digital surveillance of people who are quarantined through mobile phone apps, location based software, drones, video calls, and close circuit television as well daily monitoring calls by local health teams. Violation can result in heavy fines and even prosecution. Other countries may find it harder to use digital surveillance measures. Countries in the Asia-Pacific region have a strong culture of surveillance combined with increased public trust in the government, whereas privacy laws in European countries and public attitudes towards governance and liberty may not support such measures.²³

Most countries fine people who are found violating isolation guidelines, and flouting the rules can result in imprisonment in Australia, Germany, Italy, Finland, and Norway. In the absence of support, penalties alone are unlikely to encourage desirable behaviours during the pandemic.²⁴ Given the material threat that covid-19 poses to individuals' health, social support with a firm belief in collective responsibility is more likely to achieve constructive actions across communities.²⁵

A key feature of monitoring compliance in countries that have been comparatively successful in controlling transmission is that their systems are driven by local public health authorities with linked testing, contact tracing, and supported isolation efforts. In the UK, contact tracing under the national Test and Trace service is divided between outsourced private companies and local health protection teams, while financial support for isolation is managed by local councils. Since the launch of Test and Trace, 98% of all contacts allocated to local health protection teams have been successfully reached, compared with 68% of those coordinated by the national call centre. 26 Without locally delivered solutions, individuals are only loosely instructed to self-isolate without support or monitoring. Improved coordination between local health protection teams, councils, and community organisations for test-trace-isolate efforts could lead to improved public trust, reporting of contacts, and adherence.

Do support interventions work?

Despite the scarce data on the effectiveness of isolation support measures, financial and comprehensive support seems beneficial. The Families First Coronavirus Response Act allowed some US employees (subject to eligibility criteria) to receive 14 days of emergency sick leave at full pay (limited by an upper threshold).²⁷ This measure is estimated to have reduced the number of confirmed daily cases by 400 per state, or 1 case for every 1300 workers.²⁷ In Israel, 94% of adults said they would comply with self-quarantine if they got financial compensation, dropping to below 57% in the absence of financial support.²⁸

While financial resources are important to enable self-isolation, wider support models are necessary to elicit high rates of adherence. Places that offer comprehensive support packages had high rates of adherence to self-isolation guidelines and few violations. In South Korea, the median number of people who quarantined was 36 561 a day, with around six violations recorded each day—a rate of 1.6 violations/10 000 self-quarantined people. Since the Asia-Pacific countries usually manage isolation through designated quarantine facilities, stringently monitored by healthcare workers, compliance is likely to be high. However, preliminary data from New York City showing high levels of isolation (box 1) indicate the effectiveness of comprehensive support.

Mutual aid groups—rapidly and widely developed to support vulnerable and shielded people to isolate—have helped protect community health and wellbeing.²⁹ The support requests and

activities of such groups show the needs of those in self-isolation and could be used to build effective isolation support policies, particularly through collaboration between local government bodies and community organisations.

Doing better

Policies around self-isolation should be supportive and compassionate in acknowledging the challenges that people face. Although strategies centred around strict monitoring and penalties for violations have not been thoroughly evaluated, they may even be counter-productive, compromising testing uptake and honest reporting during contact tracing and eroding public trust. ¹⁹ Regular reporting of self-isolation behaviours is also needed to monitor the effectiveness of test-trace-isolate systems.

Local government driven efforts are central to successful crisis management but remain a largely overlooked and ignored tool.³⁰ Being led by local health protection teams is an important, perhaps defining feature, of effective test-trace-isolate systems. The covid-19 pandemic presents many opportunities to improve links between local public bodies and community based organisations and to empower and mobilise community stakeholders to contribute to multiple aspects of the covid-19 response, including supportive strategies to encourage and facilitate self-isolation and quarantine.

Public knowledge and perceptions are varied and influence personal choices.³¹ The reason that someone needs to self-isolate is relevant in determining whether they fully comply. Particular emphasis should be placed on explaining the rationale for self-isolation. Clear public health messaging, with information accessible in a range of languages and to communities with varying degrees of health literacy is therefore important.

Finally, everyone instructed to self-isolate or quarantine should be entitled to adequate comprehensive support to do so safely. Sufficient immediate support should be offered to make isolation feasible, with particular consideration for those unable to safely separate at home and requiring designated quarantine facilities.

Our findings add strength to the call for urgent action around isolation measures, endorsing locally delivered, comprehensive support models.³² Without effective policies enabling people to safely self-isolate and quarantine, the success of test and trace infrastructures is jeopardised.

Key messages

- Inadequate financial support is a commonly cited factor for not following self-isolation or quarantine rules
- Comprehensive support models are required to make self-isolation or guarantine feasible
- Alternative accommodation should be made available for people who cannot safely isolate at home
- Locally delivered solutions and community engagement are highly effective, particularly for vulnerable or low income populations

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