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Journal:	ВМЈ
Manuscript ID	BMJ-2021-064618
Article Type:	Analysis
BMJ Journal:	вмл
Date Submitted by the Author:	02-Feb-2021
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Keywords:	Public Health, Health Policy, COVID-19

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Analysis

International approaches to covid-19 self-isolation and quarantine: an analysis of support, monitoring and adherence

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Word count: 1883 words References: 30 references

KEY MESSAGES

- Inadequate financial support is a commonly cited factor for low adherence to self-isolation or quarantine.
- Comprehensive support models are required to make self-isolation or quarantine feasible.
- Alternative accommodation should be made available for individuals unable to safely isolate at home.
- Locally-delivered solutions and community engagement are highly effective, and have particular benefit amongst vulnerable or low-income populations.

International approaches to covid-19 self-isolation and quarantine: an analysis of support, monitoring and adherence

Jay Patel and colleagues demonstrate that comprehensive, community-based support initiatives could significantly improve public adherence to self-isolation instructions—a cornerstone of the covid-19 response.

Lessons from international approaches, prioritising elimination strategies to covid-19, have consistently demonstrated the importance of a fully-functional and locally-delivered test-trace-isolate-support system.¹² The ability for people to isolate is foundational to this multi-pronged approach, as this component is required to break chains of transmission, thus reducing infection rates in a population. Even the most effective mass testing and intense contact tracing systems have only marginal value, if positive cases and close contacts are unable or unwilling to self-isolate. In this analysis, key insights are presented from a scoping review of 20 countries, characterising available support initiatives to self-isolation and quarantine measures, current approaches to monitoring compliance, and public adherence (table 1). This analysis focuses on positive and confirmed cases of covid-19 and does not include travellers.

How strong is public adherence?

Despite the paucity of high-quality data on adherence to self-isolation or quarantine measures, the few available studies are consistent in their findings: adherence to self-isolation in the UK is significantly lower than intention to do so; financial and logistical factors determine an individual's ability to comply; and the reason for isolating is relevant in predicting compliance, in particular symptomatic and positive cases are more likely to adhere than contacts of positive cases.³

Through a series of online surveys conducted in the UK, responses from over 30,000 participants found that 18% self-reported full adherence to self-isolation orders (i.e. not leaving home in the seven days prior to developing symptoms), and only 11% of close contacts quarantined.⁴ These figures are far from stated public intention to self-isolate and quarantine, which are around 70% and 65% respectively.⁴ Commonly cited factors influencing low adherence included, but were not limited to, childcare responsibilities, experience of pandemic hardship, less awareness of covid-19 guidance, and working in a key worker sector. 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, data from Iran showed that although ability to adhere did not follow the social gradient, people of lower subjective social class were less likely to comply with social-isolation measures due to the lack of perceived social support.⁶

In the Netherlands, intention to isolate at home, following a positive test result, was around 95% in a sample of 64,000 people, reducing to 84% if a member of their household had tested positive and 43% if a close contact had covid-19.⁷ A small Norwegian study revealed that 65% of people required to self-isolate had not adhered to the request. Yet, compliance was twice as high for symptomatic cases.³

Increased adherence can be predicted in countries with higher pre-pandemic levels of trust in politicians and institutions.⁸ Longitudinal analysis of compliance to UK guidelines found that trust in government is associated with compliance intentions, but similar analyses on reported behaviours are currently lacking.⁸

What support measures are being offered by governments?

The term *support*, in the context of this analysis, refers to a financial or other non-financial measure, facilitating an individual to fulfil their self-isolation or quarantine guidance for the stipulated time period. In most countries, isolation is mandatory and lasts between 10 and 14 days, with France and Vietnam as notable exceptions (7 days and voluntary, 21 days and mandatory). Across countries where support packages were offered, four broad support categories emerged: financial support, employment benefits, practical support, and comprehensive service packages.

Some countries offer one-off financial support for cases and contacts to self-isolate. Amongst the most generous are Australia (up to \$1,500),⁹ the United Kingdom (£500, on application and based on strict criteria), and South Korea (\$364), while Singapore and Taiwan reimburse individuals for each day spent in isolation (\$100/day and \$35/day respectively).¹⁰ In the UK, eligibility applies only to those who receive government benefits,¹¹ whereas East Asian countries extend their offer of financial support to all individuals required to isolate, regardless of their economic context.

Employment benefits are also commonly issued, often alongside nominal allowances. Generally, these benefits can only be availed for those with an employed status or those who meet a specified income level. In the UK, around 2 million low-paid workers are not entitled to statutory sick pay of £95.85 per week.¹²

In Europe, some countries have offered practical support through direct community engagement. In December 2020, the French government announced that health teams would conduct home visits to confirmed cases, advising them to self-isolate, offering antigen (rapid) tests for household members, and providing extra practical support. ¹³ In the Netherlands, those isolating can contact local municipalities and the Red Cross for help with food, medication and other necessities. Alongside Denmark and Norway, local governments can offer alternate accommodations for anyone unable to isolate at home.

Local authorities in South Korea, Taiwan, and in New York City offer a comprehensive support packages. In South Korea, quarantined individuals are provided with daily necessities and sanitary kits worth around \$60, and financial support of \$374.10 Quarantine facilities are also provided to those who cannot isolate at home. In Taiwan, local government centres offer transport arrangements, food deliver, medical care and household services, including accommodation for people without a residence alongside aforementioned financial support.

Throughout the United States, several comprehensive support initiatives have been developed. Every neighbourhood of New York City has access to 'Take Care' packages to support positive cases and close contacts to self-isolate (box 1). ¹⁴ ¹⁵ In San Francisco, the 'Right to Recover' programme provides eligible workers with two weeks of salary reimbursement at the minimum wage (\$1,285), practical support, and alternative accommodation if required. ¹⁶ Also, a novel community-based 'Test-to-Care' model was designed to specifically address vulnerable, low-income populations (box 2). ¹⁷ In Vermont, housing policies were central to their response, enabling people to safely isolate from household members, often in multigenerational or crowded settings. ¹⁸ Given that poor housing condition is considered a major risk factor for covid-19, ¹⁹ ²⁰ pre-existing infrastructure to provide comprehensive housing protection for vulnerable communities was rapidly strengthened in the state.

How is public adherence being monitored?

Across all countries reviewed, systems to monitor compliance were used at varying degrees of stringency. Broadly, two mechanisms emerged for compliance monitoring: regular or random checks conducted in person or by telephone, and digital surveillance technologies. Checks were either coordinated by local public health authorities or private sector staff, and supported by the police. Digital surveillance was conducted via mobile phone applications, location-based software, video calls and CCTV footage. Except in France, fines are imposed

on persons found violating isolation guidelines. To be allowed to self-isolate at home, in Slovakia, individuals must install a mobile application, allowing random facial recognition checks and tracking information. Generally, in the Asian–Pacific region, a combination of daily monitoring calls by local health teams and digital technologies were used.

In the absence of support, penalties alone are unlikely to encourage desirable behaviours during the covid-19 pandemic.²¹ Given the material threat posed by covid-19 on individual health, social support together with a firm belief in collective responsibility, are more likely to achieve meaningful constructive actions across communities.²¹

Weekly statistics reported from the NHS Test and Trace programme in England consistently show that cases and contacts monitored and managed locally, substantially outperform their counterparts—coordinated under wider, non-specific systems—in testing, contact tracing and isolation metrics.²² Since the launch of NHS Test and Trace, 98% of all contacts managed by local health protection teams have been successfully reached, falling to 68% for those coordinated via wider online and call centre capacity.²³ Without locally-delivered solutions, individuals are only loosely instructed to self-isolate without support or longitudinal monitoring.

How effective are support interventions?

Few evaluations exist for international support strategies during the covid-19 pandemic. The Families First Coronavirus Response Act, introduced on March 14th 2020, allowed US employees to receive 14 days of COVID-19-related emergency sick leave at full pay (limited by an upper threshold).²⁴ The estimated impact of this measure is a reduction of 400 confirmed cases per state, per day, or 1 case per 1,300 workers.²⁴ Of a small sample of adults surveyed across Israel in late February 2020, estimated compliance rates were as high as 94% when financial compensation was assumed dropping to below 57% in the absence of financial support.²⁵

Where comprehensive support packages were offered, adherence to self-isolation guidelines was high and violations low. In South Korea, the median number of people that quarantined was 36,561 per day.²⁶ The median number of daily self-quarantine violations was 6—a rate of 1.6 violations per 10,000 self-quarantined individuals.²⁶ Given that in the East Asian and Western Pacific regions isolation is usually managed via designated quarantine facilities, stringently monitored by health care workers, compliance is assumed to be high.

Although preliminary, the effectiveness of community-based support in New York City (box 1) and San Francisco (box 2) are confirmed by high levels of acceptance or adherence. Comprehensive support measures have demonstrated that whilst financial resources are important and enable the feasibility of self-isolation, they should not be relied upon solely. Wider support models are necessary to elicit high levels of adherence.

Box 1: New York City's 'Take Care' initiative

The rationale underpinning the 'Take Care' initiative in New York City is to provide any resources an individual requires to safely observe their full self-isolation period either in a hotel, or if desired, at home. This initiative is coordinated locally, involving Resource Navigators from community-based organisations to deliver a wide range of services including, financial help, food delivery, health insurance, medical kits, pet care, and mental health support. The support package has high acceptance, with only a 2% return rate. 15 Preliminary findings reveal that contact tracers are able to locate over 80% of people at home. 15 This figure is increasing as the initiative continues to strengthen, and adherence

Box 2: San Francisco's 'Test-to-Care' initiative

may be as high as 95%.27

The 'Test-to-Care' model involves engaging community members and local public health leaders in a densely populated, and predominantly Latin American neighbourhood of San Francisco, California. The model has three support strands: informational services, practical services (such as groceries, medication, hygiene products, and other necessities) and longitudinal medical, social and emotional support. Support is delivered by healthcare providers and community health workers. Although its evaluation did not directly assess adherence to isolation and quarantine, 65% of participants received ongoing community support for the duration of the self-isolation period.¹⁷ Additional advantages were also noted; around 1 in 10 participants disclosed more contacts than at the initial contact tracing interview.¹⁷

What are the key insights for improving adherence?

The evidence presented in this analysis demonstrate that policies around self-isolation should be supportive and compassionate in acknowledging individual challenges. While strategies centred around strict monitoring and issuing penalties for individuals seen to

violate instructions have not been thoroughly evaluated, these may even be counter-productive, compromising testing uptake, honest reporting during contact tracing, and erode public trust.²⁷ Regular reporting of self-isolation behaviours is also needed to monitor, in real-time, the effectiveness of test-trace-isolate systems.

Community engagement is central to successful crisis management, but remains a largely overlooked and ignored tool.²⁸ Local health teams leading test-trace-isolate systems is an important, perhaps defining feature of its effectiveness. The covid-19 pandemic presents plethoric opportunities to empower and mobilise community-based organisations, health committees, local leaders, and key stakeholders for multiple aspects of the covid-19 response, including supportive strategies to encourage and practically facilitate self-isolation and quarantine.

Public knowledge and perceptions are varied and influence personal choices.²⁹ The reasoning pertaining to a person's need to self-isolate is relevant in determining the likelihood of their full adherence. Particular emphasis should be placed on explaining the rationale for self-isolation. Informational support is therefore a key component, necessitating clear public health messaging. This should be accessible to different communities with varying degrees of health literacy, and covering a diverse range of languages.

Finally, all individuals instructed to self-isolate or quarantine should be entitled to adequate comprehensive support, allowing them to safely observe their allocated time period. Sufficient baseline support should be offered to make isolation feasible. Particular consideration is warranted for those who may not be able to safely separate at home and require designated quarantine facilities to accommodate this.

Given the fast-evolving nature of covid-19 policies, this analysis provides a timely snapshot of current international approaches. Our findings add strength to the call for urgent action around isolation measures, endorsing locally-delivered, comprehensive support models.³⁰ Without effective policies enabling people to safely self-isolate and quarantine, the success of an entire test and trace infrastructure is jeopardised—a system foundational to eliminating covid-19.

Contributors and sources

JP drafted the manuscript. JP and GF jointly collated data for this analysis. GF and DS critically revised the draft. All authors conceived this analysis and approved the final version of the manuscript.

DS is on the Scottish Government COVID-19 advisory group, on the Royal Society DELVE group that feeds into SAGE and a member of the UK Cabinet Office's International Joint Comparisons Unit.

Acknowledgements

Financial Support

We acknowledge support of Wellcome Trust [106635/Z/14/Z].

Patient involvement

242 None

Conflicts of Interest

We have read and understood <u>BMJ policy on declaration of interests</u> and have the following

246 interests to declare:

DS is on the Scottish Government COVID-19 advisory group, on the Royal Society DELVE group that feeds into SAGE and a member of the UK Cabinet Office's International Joint Comparisons Unit.

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Table 1: Summary of findings from 20 countries on support, monitoring, and penalties pertaining to covid-19 self-isolation and quarantine.

Country	Available support	Eligibility for	Self-isolation	Enforcement and	Penalties for
		support	guidance	monitoring	violation
Australia	Employees in Victoria can	Any individual who	Mandatory self-	Public health staff can	\$5,000 in Victoria.
	apply for a \$450 COVID-	has to isolate and	isolation for 14	monitor through telephone	Up to \$11,000 (with
	19 Test Isolation Payment	does not have paid	days.	checks. Isolation in	a further \$5,500 fine
	to support self-isolation	sick leave or any		designated facilities, may	for each day the
	whilst waiting for test	government income		be required if adherence is	offence continues)
	results, and \$1,500 if	support.		breached. Periodic checks	and/or 6 months in
	income is lost while			by police officers.	prison in New South
	isolating as a confirmed		W/ /		Wales.
	case or close contact.		76		Up to \$13,000 in
	\$300 available in South		, (1/3	Queensland.
	Australia.			10.	
Belgium	70% of earnings and a	Employed individuals	7 days positive	Spot checks by public	Fine of €250 rising
	nominal allowance of €150	required to isolate.	cases (including	health staff.	to €4,000 for serious
	per month.		3 days without	9 5	or repeat offences.
			experiencing	* //	
			symptoms) and		
			10 days for		
			close contacts		

			or 7 days with a		
			negative test.		
Canada	Income support of \$450	Missed at least 50%	Voluntary self-	Public health agencies are	Repay Canada
	per week through the	of work week due to	isolation for 14	responsible for monitoring	Recovery Sickness
	Canada Recovery	an instruction to self-	days.	adherence.	Benefit back to the
	Sickness Benefit, for up to	isolate.			Canada Revenue
	two weeks.				Agency.
Denmark	Voluntary quarantine	Individuals unable to	Mandatory self-	Random physical checks or	Fine of 3,500 DKK.
	facility offered (exclusive	self-isolate at home.	isolation for 14	phone calls.	
	of food).	(6)	days.		
		7/.			
Finland	100% of lost income	Employees that have	At least 10 days	Official quarantine and self-	Fine depending on
	during isolation period.	suffered a financial	since symptom	quarantine are not	annual income, or
	Alternative	loss due to self-	onset and until	monitored. Police can	up to 3 months
	accommodation can be	isolation and cannot	symptoms have	investigate if violation has	imprisonment.
	provided if required.	isolate at home.	resolved for 48	been reported.	
			hours.	VII.	
France	90% of gross salary	Employed individuals	Voluntary self-	Occassional home visits by	No penalties.
	reimbursed plus daily	required to isolate.	isolation for 7	public health officials.	
	allowance (50% of daily		days.		
	basic wage for 30 days).				
	Health teams can offer				

	home visits, providing				
	practical and support.				
Germany	Employees who test	Employed individuals	Mandatory self-	Containment scouts can	Fine of up to
	positive are entitled to	required to isolate.	isolation for 10	conduct phone checks or	€25,000 (dependent
	remuneration (for up to six		days.	home visits.	on monthly income
	weeks) as per statutory				and location), or up
	sick pay.	90			to 5 years in prison.
Israel	Isolation Benefit,	Employed individuals	Mandatory self-	Police and Ministry of	Fine of up to \$140,
	equivalent to sick pay, but	required to isolate.	isolation for 10	Health inspectors perform	and potential
	standard deduction	4/.	days and until a	checks to detect violations.	imprisonment.
	applies. No more than 4		certificate of		
	days sick days will be		recovery is		
	deducted for each		issued.		
	isolation duration.		, (1/3	
Italy	Daily phone calls by a	Unclear. Italian	Mandatory self-	Public health operators	Fines of €500 to
	public health professional	officials determined	isolation for 10	monitor cases through	€5,000, with risk of 3
	for a small minority of	that isolating people in	days.	telephone checks.	to 18 months
	people.	dedicated facilities is		Geolocation data used to	imprisonment.
		not feasible.		monitor movement.	
Japan	Sickness allowance equal	Any employed and	Voluntary self-	No monitoring.	No penalties for
	to two thirds of their	insured individuals	isolation for 14		refusing to self-
	average daily wage over		days either at		isolate.

	the most recent 12-month	who have to self-	home or in		
	period.	isolate.	designated		
			facilities.		
Netherlands	Temporary self-	Anyone that has	Voluntary self-	Police and special	Fine of €95.
	employment income	suffered a financial	isolation for 10	investigating officers can	
	support and loan scheme.	loss due to self-	days.	enforce fines. Public health	
	Local municipality and	isolation.		messaging around morals	
	Red Cross can offer	86		and self-discipline used to	
	practical support and	1//:		maximise compliance.	
	alternate accommodation.	(9/			
New	The Covid-19 Leave	Must have been told	Mandatory self-	Medical officials with the	Under the COVID-19
Zealand	Support Scheme pays	to self-isolate by a	isolation for 14	help of police.	Public Health
	employees \$585 per week	health official.	days.		Response Act 2020,
	of full-time work (>20		76		either 6 months
	hours/week) and \$350 for		, (1/3	imprisonment or a
	part-time work (<20			10.	\$4000 fine.
	hours/week) for 2 weeks.			Ch,	
	COVID-19 Short-Term				
	Absence Payment is a				
	one-time \$350 payment			1//	
	available for workers who				
	are self-isolating whilst				
	awaiting test results.				

Norway	Statutory sick pay: 80% of	Employed individuals	Mandatory self-	Police checks.	Fine of 20,000 NK
	salary up to annual salary	required to isolate.	isolation for 10		and up to 15 days
	cap of 60,000 NOK	Accommodation	days.		imprisonment.
	(£52,600).	provided for persons			
	Local municipality can	who cannot isolate at			
	cover the cost of an	home.			
	alternate accommodation				
	if necessary.	26			
Singapore	Employed residents	Any individual	Mandatory self-	The Ministry of Health will	If found to be non-
	receive paid sick leave.	required to quarantine	isolation or	establish if a quarantine	compliant,
	\$100 daily compensation.	eligible for sick pay.	quarantine for	order should be served in	quarantined
	Unemployed residents can	Daily compensation of	14 days.	the home or in dedicated	individuals may have
	contact agents for social	\$100 available to self-		government facilities.	to wear an electronic
	and financial assistance.	employed citizens,	76	Individuals monitored by	tag or receive an
		permanent residents,	. (video calls and/or mobile	order to be detained
		Permanent Residents		applications at least 3 times	and isolated in a
		or Workpass Holders.		daily, along with spot	hospital/other
				checks.	suitable facility.
				9 5	Violation risks
				1//	prosecution under
					Section 21A of the
					Infectious Disease
					Act.

Slovakia	State-run quarantine	Individuals unable to	Mandatory self-	Installation of the	Fine of up to €1,659
	facilities available if home	self-isolate at home.	isolation for	eQuarantine	
	isolation is not possible.		minimum 14	mobile application is	
			days.	mandatory for home	
	VO _A			isolation, providing location-	
	1///			based tracking and random	
	1.40			facial recognition requests.	
Spain	Employed individuals	Employed individuals	Mandatory self-	Random physical checks or	Fine of €3,000 rising
	entitled to a benefit in	required to isolate.	isolation for 10	phone calls.	to €600,000 for
	addition to a dedicated	'/6/	days.		repeat offences.
	sickness benefit, of 60%				
	salary up to 15 days.				
South	Quarantined individuals	Any individual	Mandatory	Mobile application or twice	Fine of up to 10
Korea	are provided with daily	required to	quarantine for	daily telephone calls, plus	million Korean Won
	necessities and sanitary	quarantine.	14 days.	random checks by public	(\$8273) in fines, a
	kits (valued at \$60), and			health workers.	so-called "1-strike
	financial support of \$374.				out policy."
Taiwan	Daily compensation of	Any individual	Mandatory self-	Twice daily checks by local	Fine of up to NT
	NT\$ 1000. Local centres	required to	isolation for 14	health	\$150,000.
	provide support services,	quarantine.	days.	agencies. Additionally, a	
	daily follow-up calls,			mobile application uses	
	transport, medical care,			location-tracking and	
	household services,			geofencing.	

	accommodation for people				
	without a residence, and				
	food delivery.				
Sweden	Salary paid if cases	Medical certificate	Voluntary	No monitoring.	No penalties.
	cannot go to work. Sick	required to confirm	personal		
	pay for anyone considered	diagnosis of covid-19.	responsibility to		
	ill. Infected individuals who		stay home.		
	are still able to work are	20			
	supported through the	1//:			
	Disease Carrier	(6)			
	Allowance.	7/.			
United	£500 each time an	Low-income groups,	Mandatory self-	NHS Test & Trace call	Fine of £1,000 rising
Kingdom	individual is required to	including those	isolation for 10	handlers make follow-up	to £10,000 for repeat
	isolate. Local authorities	receiving government	days and 14	calls to those isolating to	offences in England,
	may provide practical	benefits.	days for close	monitor compliance. Police	£480 in Scotland,
	support for vulnerable		contacts.	checks can be conducted in	and up to £1000 in
	individuals.			high incidence areas.	Wales.
				Employers have	
				responsibilities to ensure	
				their staff observe self-	
				isolation guidelines.	

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