

RAMPing up? Lessons from TestRAMP as a marketplace solution for COVID-19 testing

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TestRAMP established a marketplace to boost supply, availability and affordability of PCR testing during the COVID-19 pandemic. This briefing considers the general lessons learned from that experience and high-level implications for how to scale up markets in scarce critical resources, or 'crisis markets', in times of emergency.

KEY POINTS

- During the COVID-19 pandemic of 2020 to 2022 laboratory-based PCR testing was a critical but scarce resource in the UK's response to the crisis. In Spring 2020, Mike Hudson established TestRAMP to help **increase testing** by **improving availability** and **lowering prices**.
- TestRAMP was a non-profit recruiter and marketplace for the business-to-business COVID PCR testing sector. As a recruiter, it helped expand the market by bringing in new testing laboratories and resellers. As a marketplace, TestRAMP facilitated better information flows, helping to bolster competition and investment. This, in turn, was intended to increase production and distribution whilst lowering prices.
- Between Q2 2020 and Q4 2021 TestRAMP played a small part in helping to reduce the wholesale price of PCR testing from £65 to £21 per test.¹ Commercial COVID PCR testing capacity rose from zero at the beginning of the pandemic to well in excess of 90,000 tests per day by September 2021.
- We should be cautious about applying the TestRAMP model, which arose from unique circumstances, to other types of crisis. However, the lessons from TestRAMP may have some applicability to unforeseen 'black swan' events where inefficiencies in a nascent market for a critical resource (a crisis market) constrain the crisis response.
- This briefing note provides considerations for setting up a marketplace in such a context and may help policymakers to quickly identify opportunities to rapidly scale up critical markets. A longer version will be available at mikehudsonfoundation.org

INTRODUCTION: THE RATIONALE BEHIND TESTRAMP

Soon after the start of the COVID-19 pandemic, prior to the development of vaccines, the UK government determined that self-isolation of infected individuals was an interim solution to the pandemic. PCR testing was a critical resource necessary to identify those infected, but was in short supply. Indeed, in the early stages of the pandemic the then government explicitly identified a need to boost testing capacity, including for PCR testing², and made several appeals to industry to help increase testing capacity in the UK.³

Mike Hudson and others involved in TestRAMP speculated that increased access to PCR testing might be achieved in part through a market mechanism. In an efficient market, sellers are subject to competitive pressures to keep their prices low and their products at an acceptable quality, and they adjust supply capacity to fulfil demand. Each actor makes pricing, quality and capacity decisions based partly on information about competitors' decisions. Information flows are therefore central to the functioning of an efficient market. Better information flows mean that, for example, a market actor can respond to its competitors cutting their prices more quickly and more accurately. Importantly, lower uncertainty enables market actors to better manage their inventory, which frees up resources for investment and expansion.

The emerging non-government market for COVID PCR testing, which comprised laboratories, resellers and consumers, was operating inefficiently due to a lack of information flows, creating a scarcity in a critical resource for the pandemic response.

To help alleviate this, in May 2020 Mike Hudsonⁱ established TestRAMP (testramp.org), a not-for-profit wholesale marketplace for PCR lab testing and genomic sequencing. TestRAMP helped commercial laboratories and other organisations buy and sell testing amongst themselves, and recruited new market actors to increase the availability of PCR testing.

TESTRAMP'S AIMS

TestRAMP's ultimate aim was to improve the availability of COVID PCR testing. It expected that the economic objectives of labs and resellers would be to **maximise their revenue** and **minimise their costs**. By working with businesses to help them achieve their own objectives, TestRAMP would be able to increase the availability of PCR testing through the following mechanisms:

Increased production and resilience

Firstly, TestRAMP's price transparency would reduce opportunities for price gouging. Instead, to increase profits, labs would have to lower their costs by **investing**, both to make their processes more **efficient** and to **scale** them, leading to **increased production capacity**.

ⁱ You can find out more on MHF's website (mikehudsonfoundation.org) and Mike's LinkedIn page (<http://www.linkedin.com/in/mikehudsonuk>)

Secondly, a combination of better information and subcontracting would enable better inventory management, freeing up capital for investment and a higher capacity utilisation rate. Where labs experienced problems, TestRAMP would arrange for other labs to maintain testing continuity for their clients.

Lower prices

Recruiting more labs and resellers would make for a more competitive market. By investing in cost reduction and scaling up production, a lab would be able to reduce its prices to gain market share. Rival labs would respond by lowering their prices. TestRAMP would allow labs and resellers to promptly detect competitors' price cuts, leading to quicker market-wide price reductions. Wholesale and consumer prices would fall continually.⁴

TESTRAMP'S APPROACH

To engage labs and resellers, TestRAMP offered them marketplace services they would find difficult to perform themselves. These services included:

- **Introductions.** The early COVID PCR testing market was filled with new resellers and labs pivoting into COVID testing from other sectors, each with limited awareness of the others. The existing distribution chains of such labs were unsuited to COVID testing; the customers of a forensic testing PCR lab might have been police crime scene investigators, for example. Without having relevant sales channels, labs pivoting to COVID testing benefitted from being introduced to potential COVID testing resellers. In all, TestRAMP worked with over 40 labs and numerous resellers, involved in a wide variety of sectors including genetic testing, oncological testing, wastewater testing and prenatal testing among many others.
- **Price Discovery.** As the market developed, it continued to be hard for labs and resellers to know at what price they should buy and sell. TestRAMP's role became one of continually contacting labs on behalf of resellers to establish which lab had the lowest price. It became more efficient for actors to use TestRAMP's marketplace service and centralised price information than to negotiate bilaterally. Labs and resellers were able to discover the lowest price, set their prices accordingly, and trade more efficiently.
- **Negotiation.** TestRAMP also began to negotiate multi-laterally with labs on behalf of resellers, to reduce wholesale prices. Where a buyer and seller could not agree a price, TestRAMP would broadcast their prices to all market participants, inviting better counteroffers to narrow the gap between the buying and selling price, ensuring all possible parties were involved in price determination. TestRAMP's comprehensive view of market pricing enabled it to almost always negotiate a better price for a reseller than it would have been able to achieve bilaterally. Negotiations were usually carried out anonymously, with the buyer's and seller's identities only being revealed if and when a transaction was agreed.

- **Price & Volume Data.** TestRAMP broadcast anonymised recent transaction prices, increasing transparency so that actors did not need to set their prices 'blind'. It also provided transaction volume information, helping labs to plan their capacity ramp-up and inventories to manage anticipated increases in demand.

As well as providing the traditional marketplace functions listed above, TestRAMP also provided the following additional services:

- **Recruitment.** TestRAMP recruited new actors into the market, including PCR labs previously engaged in other fields. By linking such labs to potential clients TestRAMP helped them pivot to COVID testing. Commercial labs, as they scaled up, substantially expanded the UK's COVID testing capacity. Alongside labs, TestRAMP also reached out to corporates, private hospitals and other organisations which might need to test their people, collectively referred to as 'resellers'.
- **'Pivot' and 'Scale' Information.** Most labs which went on to perform COVID PCR testing had previously carried out PCR testing for other, unrelated, purposes. TestRAMP provided them with information to help them pivot into COVID testing, and to scale up, including about: PCR testing itself, emerging alternative technology, regulations, distribution/logistics, technical specifications and marketplace statistics.
- **Subcontracting.** In most transactions labs were the 'sellers', and resellers the 'buyers'. Unlike many marketplaces, TestRAMP also allowed labs to buy from each other. Sometimes a lab would choose to operate below 100% capacity utilisation rate (CUR), to allow headroom for demand surges. TestRAMP enabled labs to operate at closer to 100% CUR by helping them to subcontract excess demand to another lab when necessary. With better information, and the ability to subcontract, labs were able to manage their inventories better, freeing up capital to grow production capacity. Where labs experienced equipment failures – potentially leaving time-sensitive COVID test samples unprocessed – TestRAMP additionally arranged for alternative labs to carry out testing.
 - In February 2021 the UK government unexpectedly increased the sensitivity/specificity requirements for the PCR assay.⁵ Most labs were unable to meet the new standards. Whilst they were upgrading to comply with the new requirements, TestRAMP arranged for them to temporarily subcontract testing to the lab which met the new standard.
- **Demand Spike Management.** In Spring 2021 many labs expected a relaxation in international travel rules. More inbound travellers would have required testing, potentially leading to a dangerous demand spike. TestRAMP launched its 'Labsure' service⁶ to facilitate capacity sharing between labs during spikes, aiming to distribute the production load across multiple actors.

TestRAMP was unusual in several other significant ways:

- **Not-for-Profit Objective:** TestRAMP's aim was to help solve a social problem. Not needing to turn a profit gave TestRAMP the flexibility to start early in the crisis, at a time of extreme uncertainty. Initially TestRAMP offered its services for free. Later it charged low fees to commercial customers, with all profits donated to charity, totalling around £2.5 million.⁷

- **Specialism:** Unlike many other marketplaces, the TestRAMP marketplace was for one specific critical resource. It chose not to address other needs such as PPE.
- **Pop-Up:** TestRAMP was rapidly deployed very near the start of the crisis and operated only for approximately two years, after which time vaccinations had made PCR testing less important.

REVIEW AND REPLAN

As the market changed TestRAMP periodically reassessed its aims and operations and replanned. For example:

- **Public Sector:** TestRAMP eventually abandoned its aspiration to funnel private sector lab testing into the government's general population testing programme and the NHS.
- **Fee Model:** Initially offering a zero-cost service, TestRAMP later maintained a non-profit stance but introduced fees for commercial actors in order to financially support charities and establish a charitable foundation.⁸
- **Workplace Testing:** 'Back to work' testing by corporates did not materialise on the scale expected. Instead, TestRAMP increasingly targeted private healthcare companies as resellers.
- **Travel Testing:** In summer 2020, certain countries began to require UK travellers to present negative PCR tests for entry.⁹ Later, the UK relaxed international travel restrictions but required inbound travellers to be tested.¹⁰ Both moves increased demand, and TestRAMP shifted focus towards private healthcare providers as resellers of travel tests. Travel testing eventually constituted the bulk of the UK's commercial COVID PCR testing.
- **Genomic Sequencing:** When the government directed that infected international travellers should have their samples genomically sequenced – to identify new variants – TestRAMP focussed on the small number of commercial labs that could carry out that work.
- **Shutdown:** By mid-2022, with the success of the vaccine program and the removal of most requirements for international PCR travel testing, TestRAMP's usefulness as a PCR marketplace had dwindled. TestRAMP closed its COVID testing marketplace.

WAS TESTRAMP USEFUL?

TestRAMP's objectives were to **improve availability** and **reduce the price** of COVID PCR testing.

Although it largely failed at supporting the NHS and bolstering government testing, TestRAMP did successfully recruit and help to scale additional commercial labs, and provided better communication channels between them, which helped to improve accessibility and lower pricing.

The extent of TestRAMP's contribution is admittedly hard to quantify, but it seems likely that it played some part in reducing prices and increasing testing capacity. Between Q2 2020 and Q4 2021 the wholesale price of PCR testing fell from £65 to £21. Consumer prices fell continually, from over £100 to £43 per test over the same period.¹¹

Commercial COVID PCR testing capacity rose from zero at the beginning of the pandemic to over 90,000 tests per day by September 2021.^{12, ii} It is also possible to see from the financial statements of some major labs such as Oncologica UK a very substantial increase in staff and fixed assets, suggesting that over this period labs involved in provision of PCR testing were able to invest and expand.¹³ The reduction in commercial COVID PCR test pricing made international travel cheaper and helped to restart business, including in the tourism and hospitality industries.

Admittedly, we can see that we or others might have done better with TestRAMP, including in the following areas:

- **Staffing:** TestRAMP failed in its initial ambition to bring underutilised PCR capacity into the government and NHS testing programmes. A TestRAMP team including members with stronger relationships with government, the NHS and the public sector may have done better at achieving this objective. Particularly during the pre-launch period, TestRAMP would also have benefitted from more specialist researchers to identify and reach out to decision-makers in organisations.
- **Scale:** TestRAMP could perhaps have used some of its fee income to scale up further. However, the uncertainties of the pandemic made it hard to see how much to scale. Given the extreme levels of uncertainty at the start of the pandemic, TestRAMP prioritised flexibility over scaling.
- **Software and AI:** If TestRAMP had had access to an 'oven-ready' business-to-business (B2B) marketplace system, akin to those of well-known online retailers, it could probably have scaled faster with less risk. Labs could have listed their own services for resellers to choose between. With the appropriate staff TestRAMP could have explored partnering with marketplace software providers to rapidly create an electronic marketplace. Additionally, if current LLM AI models such as ChatGPT had been available in early 2020 they would have been invaluable for researching labs and resellers and extracting information about them from online sources as well as parsing price information in unstructured emails from labs and resellers.
- **Consumer Prices:** TestRAMP was only active in the wholesale market. Although consumer prices fell from about £100 per test to £43 in 2021¹⁴, there was often a considerable time lag between reductions in the wholesale price and falls in the consumer price, suggesting that resellers were not subject to the same competitive pressures as labs. TestRAMP could have provided a reseller price comparison service. This could have helped consumer prices to fall more

ⁱⁱ UK government-mandated PCR testing of inbound travellers peaked at c. 91,000 tests per day. Total commercial testing was substantially greater because private labs were also testing outbound travellers and for non-travel purposes.

quickly by increasing retail price transparency and therefore reseller competition. A commercial service of this type did emerge later in the pandemic.

TESTRAMP AS A TEMPLATE?

Might a TestRAMP-style facility (TSF) be useful in other crises as a solution to a crisis market situation?

TestRAMP was a reaction to the unique challenges of COVID-19. Most other crises will be quite different, both in the needs of the affected community and the services that a TSF would need to offer to engage producers and resellers in a marketplace. Below are the key considerations we argue are needed to decide whether a TSF-based approach is necessary or desirable.

Critical resource

The UK COVID PCR testing market was a poorly functioning market for a scarce critical resource which was inadequate to the needs of that crisis. A TSF is only likely to be useful where inefficient or novel markets in scarce critical resources are acting as a bottleneck on the crisis response.

TestRAMP focused on increasing the availability of PCR testing. In contrast, many crises, such as natural disasters, are characterised by shortages in multiple scarce resources. It might therefore be challenging to adapt a TSF to work with multiple scarce resources, with a risk of losing focus.

Specialised knowledge

Many crises would need specialist local knowledge and skills to map and analyse local supply chains in the market for the scarce critical resource (see, for example, the EMMA toolkit).¹⁵ This wasn't necessary for TestRAMP because information about PCR labs and resellers was easily available. To provide such capabilities in other crises might be expensive.

Recruitment and supply chains

TestRAMP recruited local (UK) labs keen to pivot to COVID PCR testing, whose existing revenue streams had been badly affected by the pandemic. Pre-COVID, they had been carrying out similar processes to those needed for COVID testing. It was therefore easy for them to pivot to COVID testing. They were keen to do so and needed help to find reseller clients in the new COVID testing market. A TSF would be unlikely to find an analogous situation in many other crisis markets, and probably could not rely on local producers pivoting from one line of business to another in the same way. Because crises are more likely to be local or regional rather than global, it may be more effective for a TSF to recruit producers from regions outside the crisis affected area. There will, however, be many local crises where there is no role for a TSF because resellers already have supply chains which include geographically remote producers unaffected by the crisis.

Monopsony

TestRAMP initially planned to funnel PCR capacity into the UK government mass testing programme. Could a TSF help a crisis market with a single buyer such as a government or an NGO? Probably it could. The TSF would gather producers of the scarce critical resource and recruit additional producers in much the same way that TestRAMP did. It would continually negotiate on behalf of the single buyer, introducing competition between producers to drive prices down. If, however, the buyer had an efficient procurement system connected to all likely producers then such a facility might be redundant. That said, it seems very unlikely that an efficient procurement system would be in place in the event of a low-probability or 'black swan' crisis.

Incumbent marketplaces

It may not be helpful to introduce a TSF to a market which already has an adequate marketplace. During much of the pandemic, PCR testing wasn't available on any popular online retail marketplace platforms. If it had been, while TestRAMP could still have recruited labs, its value as a marketplace is uncertain.

Generally, in a crisis market, although having multiple sellers on an incumbent platform would create more price visibility, there might still be a role for a TSF given that some platforms do not allow buyers to price-signal via an auction process, whilst others are business-to-consumer (B2C) rather than B2B. It is likely therefore that the utility of a TSF as an additional marketplace would depend on the specific nature of any incumbent marketplace.

Preparedness

Where a crisis has been anticipated and prepared for, there may be no role for a TSF. Areas susceptible to frequent hurricanes, for example, may have evolved resilient supply chains and effective crisis management systems to deal with expected periodic scarcity of critical resources.

CONCLUSION

To summarise, the TestRAMP approach is unlikely to have extensive applicability to most other crises. However, it is most likely to be relevant to crises that exhibit the following features:

- Not foreseen or adequately prepared for.
- Crisis response held back by an inefficient crisis market in a single scarce critical resource.
- Poor B2B and/or B2C information flows in the market for the critical resource.
- Existence of potential new market players who can plausibly 'pivot' their operations to the provision of the critical resource.
- Non-existent or suboptimal marketplaces and/or procurement processes for the critical resource.

Assuming that a future crisis satisfies some or all of these conditions, what would a good TSF look like? The TestRAMP example suggests that the combination of a not-for-profit stance and robust competitive market operation could give a TSF flexibility to rapidly start operating and to respond to policy changes. A singular focus on the critical resource in question and a 'pop-up' approach – to supply services only as long as this is useful to the crisis response – further aid this objective by avoiding overstretch.

The exact mix of services a TSF should provide will depend on the specific market (and incumbent marketplaces, if they exist) in question, but providing recruitment services and 'pivot information' on top of typical marketplace functions may provide crucial added value, particularly when the key goal of the crisis response is to ramp up production of a scarce resource.

A new TSF should also prioritise building a team with deep relationships with government and the public sector. This was a limitation on the effectiveness of TestRAMP and would likely be an important constraint on the ability of another TSF to deliver on its objectives.

Hopefully we will not be in a situation where a new TSF is needed. But should such a crisis arise, it is vital that one can be set up quickly and given the tools it needs to be effective.

ENDNOTES

¹ TestRAMP estimates.

² DHSC (2020). *Coronavirus (COVID-19) Scaling up our testing programmes*.

³ DHSC (2020). *Help the government increase coronavirus (COVID-19) testing capacity*. Archived from the original, snapshot 10 April 2020.

⁴ <https://www.bbc.co.uk/news/business-56743075>; <https://www.randox.com/covid-19-pcr-43-travel/>.

⁵ DHSC (2021). *Testing on day 2 and day 8 for international arrivals – minimum standards for test providers*. Archived from the original, 14 February 2021.

⁶

<https://web.archive.org/web/20231114135335/http://web.archive.org/screenshot/https://www.labsure.org/>

⁷ <https://www.zsl.org/news-and-events/feature/TestRAMP-and-zsl-our-corporate-partnership>;
<https://web.archive.org/web/20211015162547/https://www.alzheimers.org.uk/get-involved/events-and-fundraising/fundraising-work/how-corporate-partners-work-with-us>.

⁸ <https://www.mikehudsonfoundation.org/>

⁹ <https://www.mofa.gov.ae/en/mediahub/news/2020/7/23/23-07-2020-uae-entry>

¹⁰ <https://www.gov.uk/government/news/test-to-release-england-introduces-testing-strategy-for-international-arrivals>

¹¹ <https://www.bbc.co.uk/news/business-56743075>; <https://www.randox.com/covid-19-pcr-43-travel/>

¹² NHS Test and Trace statistics 28 May 2020 to 6 April 2022.ods”, Tables 20a and 20b; <https://assets.publishing.service.gov.uk/media/62580f9ad3bf7f601560bb33/NHS-Test-and-Trace-data-tables-14-April-2022.ods>

¹³ <https://find-and-update.company-information.service.gov.uk/company/09305104/filing-history/MzM0ODQ2OTg3OWFkaXF6a2N4/document?format=pdf&download=0> (See page 1 and 13).

¹⁴ <https://www.bbc.co.uk/news/business-56743075>; <https://www.randox.com/covid-19-pcr-43-travel/>

¹⁵ <https://www.emma-toolkit.org/>