COVID-19: Supply of Personal Protective Equipment

Public Accounts Committee

Written evidence submitted by Professor Peter Murphy from Nottingham Trent University

This inquiry continues the NAO and PAC's work on the government's response to the COVID-19 pandemic and will examine the preparedness and response to the supply of personal protective equipment (PPE) in England, including the scale of, and reasons for shortfalls in supply.

1. **Introduction**

This submission relates to one of the long-term reasons for the shortfall in supply, namely the inadequacy of the supply chain, its structure, management and reporting across the Healthcare system in the UK.

It has been prompted by assisting post-graduate students involved in the 2020/21 ongoing international competition organised by the Supply Chain Advancement Network in Health (SCANH[1]), in partnership with the Health Information and Management Systems Society (HIMSS [2]). This competition is being hosted by the Odette School of Business at the University of Windsor in Canada[3]

The virtual business case competition this year is entitled:

"COVID-19 and Canada's Healthcare System: Opportunity for Supply Chain Coordination"**.**

The competition provides students from around the world an opportunity to showcase their knowledge and skills to create innovative solutions that address a real-world health system challenge. This year's competition focuses on supply chain challenges of sourcing PPE to protect patients and health workers during COVID-19. Participating students take the role of a consulting team advising the Government of Canada on the development of a coordinated healthcare supply chain. Some of the lessons to learn and potential improvements are potentially transferrable to England and the UK.

The 'problem statement' for the competition could equally reflect the challenge in England and the UK and complement previous work by the NAO (2020a, 2020b) and the PAC (2020).

> "As COVID-19 progressed, Canada as a nation and its individual provinces and territories scrambled to meet the briskly evolving and exceptionally high demand for PPE and other medical supplies for the healthcare workforce in particular. It very soon became clear that, despite past experiences with epidemics and other public health crises, such as SARS, Canada was totally unprepared to effectively and safely manage COVID-19 from a supply chain point of view". (Snowden and St Pierre 2020)

[1] SCANH is an international knowledge mobilization network with a vision to advance global capacity to adopt and scale best practices in healthcare supply chain to offer traceability of products and care processes from bench to bedside to patient outcomes.

[2] HIMSS is a mission driven non-profit global advisor and thought leader supporting the transformation of the health ecosystem through information and technology.

[3] The case study was written by Anne Snowden Professor of Strategy and Entrepreneurship and Scientific Director & CEO, Supply Chain Advancement Network in Health Academic Chair, World Health Innovation Network and Melisa St Pierre both of the University of Windsor.

The Healthcare Information and Management Systems Society also produce a Clinically Integrated Supply Outcomes Model for assessing and improving healthcare supply chains (HIMSS Analytics 2020). The model assists organizations in creating a high-performing, clinically integrated supply chain infrastructure to create visibility and transparency of data that tracks care processes linked to patient outcomes, scaled across health system environments.

The next section will briefly describe the Canadian context before identifying generic systemic challenges that might represent common opportunities to improve the structure, management and reporting of the PPE supply chain across the Healthcare system in the UK.

2. The Canadian Context and its challenges

Canada has a population of 37.9 million distributed over 9 million square kilometres. Healthcare deemed medically necessary is publicly funded, including primary, hospital, community, homecare and GP services (approx. 70%). Services deemed not medically necessary, such as dentistry rehabilitation or aesthetic services, are individual/insurance based. The federal Government establishes national principals (standards; universal provision, portability across jurisdictions etc.) and funds the system. The nine provinces and three territories are responsible for organisation, management and delivery, with the exception of prevention and protection services and medical services for first nation reservations, the armed forces, veterans, and those in prison.

Provincial and territorial procurement systems operate very different models with decentralised systems in Ontario and Quebec, and a more centralised systems in British Columbia, while Alberta has recently transitioned from the former to the latter (Snowdon and Wright 2018[4]).

Overall, healthcare costs were $264b in 2019, or $7,098 per capita, and represented 11.6% of GDP (CIHI 2019), which is all higher than their equivalents in the UK. The government describes it as “an interlocking set of 10 provincial and territorial health systems”. Shared Services Canada provides IT services to the federal and provincial healthcare systems and in June 2020, Public Services and Procurement Canada created a digital platform, the ‘Supply Hub’ to connect suppliers and healthcare organisations with federal, provincial, and territorial resources for the buying and selling of PPE.

In contrast to car manufacturing, grocery production and delivery, or safety on airlines, the healthcare sector have relatively underdeveloped supply chains and immature logistics.

> “The grocery industry tracks and traces every item from the producer to the end consumer to ensure their safety and trackability are highly visible in the event that any food item be contaminated, or any product be found unsafe to consumers….automated supply chain infrastructure and tacking tools are key characteristics that are readily transferable to clinical environments in health systems” (Snowdon and Alessi 2018 p.19).

The SCANH considers that increased visibility in the health care supply chain systems may be the catalyst for innovation and transformation that can address ever-present patient safety challenges and the growing cost pressures that all healthcare systems currently face both during the response to COVID-19, but likely to endure in the long-term (Snowdon and Alessi 2018).

3. Generic challenges (and opportunities) identified in Canada and replicable to the UK.

[4] Alberta adopted a supply chain transformation strategy, with supply chain infrastructure moving towards being fully integrated based on GSI Barcoding. Despite implementation challenges this case study reported reduced costs and improved safety, quality and performance.

A national strategy

There appear to be significant challenges (and opportunities) evident for procurement, supply chain management, and the healthcare community to improve supply chain resilience, but this will need a national strategy and legislation to coordinate and produce the much more collaborative, coordinated, and systemic response that current and previous research suggests is necessary. Previous international research on health crises identified this need as a key lesson that has not been as evident during COVID-19 to-date, as would have been desirable (Patel *et al.* 2017, Park *et al.* 2020).

In the UK context, a fully integrated and internally visible economic, efficient and effective supply chain will also be necessary for delivering the triple aims of the current NHS Long-Term Plan (improved population health, improved healthcare experiences, and sustainable finances). As Snowden and St Pierre (2020) explain in their case study.

> "[Best] value is defined from the perspective of the health system stakeholders namely patients and families, provider teams and clinicians, health organisations (Hospitals GPs Community Care) industry (manufacturers of products or service providers) and policy makers".

All key stakeholders must share 'multiple and several' responsibilities for optimising the outcomes of the system.

In terms of supply, public sector procurement, in the UK has increasingly been focussed on lowest costs in order to optimise savings since the 2008/09 recession and the onset of austerity, but this has been at the expense of achieving value for stakeholders, including healthcare organizations, clinicians and clients (Snowdon *et al.* 2019). A more patient centred approach is required.

The NHS Confederation has recently come to a similar position, with regard to the desire to develop and promote Integrated Care Systems (ICSs) as part of the delivery of the NHS Long-Term Plan.

> "Integrated Care Systems should be given a statutory footing through legislation and must embed partnership/collaborative working and recognise the key role that local government, independent and charitable providers, voluntary sector organisations and community representatives must play in systems alongside NHS services. A new statutory duty should be introduced on all partners within systems (including local authorities) to deliver against shared objectives of the Long-Term Plan with Integrated Care Systems having much greater autonomy to focus on delivering local communities needs and priorities".
>
> (Das-Thompson *et al.* 2020)

Inventory management

Efficient and effective automated inventory management systems are a key requirement for a more resilient system. They would reduce the manpower needed for managing stock requirements, whilst automating the process. Effective systems can also deliver visibility of demand, price trends, and products due in and predict the demand curve.

Comprehensive, responsive and flexible inventory management solutions have had to be established at a number of locations in the UK (as they have in Canada) to manage the additional storage of PPE used by hospital staff.

> "Those without systems are struggling, and will need more manpower to manage the situation, but of course without the Covid-19 testing available, second-line worker's resource

> is also reduced, that's without the clear shortages of PPE equipment available…. Even when the pandemic subsides, these inventory challenges won't disappear. The NHS must still manage the existing stock for routine treatments that are currently being delayed because of the virus".
>
> (Leonards 2020)

Transparent Supply Chains

Snowden and St Pierre (2020) have sought to demonstrate that a fully visible and transparent supply chain for the healthcare system is necessary (although not sufficient on its own) for achieving [Best] value. This must include

> "objective, accurate measures of the healthcare that healthcare systems deliver for their patients and clients and more broadly the populations that they service… System stakeholders should be able to track and trace the care patients receive, the products used to deliver care , the health outcomes that care achieves for patients, the potential risks that patients may face that provider teams can mitigate and manage and the value of patient care procedures"

The NHS Confederation has recently come to a similar position with regards to the delivery of the Integrated Care Systems (ICSs) of the NHS Long-Term Plan. In a recent publication where it identifies "Ten High Impact Actions for ICS success", the use of data, its co-ordination in a control centre or hub, and its visibility to the whole community of interest, are reiterated as essential to long-term success.

> "Gain, and keep refreshing, detailed analysis of the value proposition of integrated care, in terms of improving population outcomes, quality of care, and reducing preventable activity, cost and unwarranted variation. Empower and enable clinical / professional leaders in relentlessly using population health data, measurement and evidence – with their teams – as the basis for targeted improvement and measuring progress. Population and system-wide insights and intelligence are a game changer; invest in the necessary analytical expertise and IT infrastructure to enable this"
>
> and
>
> "During Covid-19, 'Incident Co-ordination Centres' have enabled system oversight, co-ordination, resource allocation... adherence to system-wide operating procedures and the escalation of risks and issues. As your system returns to 'a new normal,' evolve your Incident Co-ordination Centre into a day-to-day system-wide function, which supports patient flow and operational management in an impartial, fair and transparent manner. Enable it to provide 'one version of the truth' in near time, informing an on-going whole system approach to operational delivery; ensure the alignment of other important system functions such as your discharge to assess function"
>
> (Buchanan *et al.* 2020)

Despite being able to track and trace all pharmaceutical products (via Global Service Relational Numbers and Global Trade Identification Numbers), the NHS needs to operationalise improved inventory management for PPE (and other healthcare products). To do this, the NHS has to adopt global product identification (GS1) standards, as well as proven technology (such as barcodes, together with GSRN and GTIN) that has been used successfully in other sectors and countries (see

Snowden and Alessi 2020). This would then facilitate the development of e-commerce processes and the automation of supply chains.

Data, information and (digital) infrastructure

Quality data of demand and consumption of PPE relies on a mature, fully digitalized, and automated infrastructure. However, digital capacity currently varies widely and has tended to be outdated and siloed. Key stakeholders need to have a 'line of sight' into the supply chain for inventory management purposes (and to assure front-line staff). In summary, what the NHS need is a clinically integrated supply chain with inventory visibility supported by sophisticated analytics based on access to robust data (see also Park *et al.* 2020 for an international perspective).

In January 2019, it emerged that NHSX would be the vehicle that would promote digital transformation in the health service. In July, at its launch, it was announced as the vehicle to deliver IT transformation for the NHS and it's 'tech vision'. As the committee will be aware the NAO have reported (in May 2020) that this

> "will require financial investment, but the government does not have a reliable understanding of how much funding is required. It will also require strong governance and accountability for delivery, which are not yet in place and which are to be led by a new unit, NHSX, which has no statutory footing".
>
> (NAO 2020c)

Manufacturer capacity, Distribution and warehousing

The supply of PPE was vulnerable to COVID-19, partially due to over dependence on overseas supplies. Locating alternative sources of supply that met regulatory standards that were not counterfeit was challenging in many countries. There was in-chain competition (Humphreys 2020) with interception of supplies and hoarding of PPE stocks making the supply chain less economic, efficient and effective.

As well as facilitating inventory visibility, the analytics platform to be implemented must facilitate communication between healthcare provider and supply chain leaders from multiple systems and providers, in order to move PPE from one hospital to another before initiating new purchasing orders. In Canada, the most appropriate scale was considered the provinces. This suggests a regional scale should be investigated in England and the UK.

Recommendations

1. On Monday 30th November 2020, it was reported that the Prime Minister will announce the establishment of a £20m Transformation fund to "increase the capacity and resilience of the UK's medicines and diagnostics manufacturing supply chains". The committee should recommend that those responsible for this fund take a wider more holistic view of this challenge and address the inadequacy of the supply chain, its structure, management and reporting across the whole healthcare system in the UK, as the context for its medicines and diagnostics manufacturing supply chains.

2. I would also urge those responsible for the fund and this committee, to consider and capture the lessons learned in the international competition organised by the SCANH, and consider inviting evidence from Professor Anne Snowdon and Dr Charles Alessi (Chair and

Visiting Scholar of the World Health Innovation Network respectively), if they have not done so already.

References

Buchanan, D, Jordan, S, Larder, R, Murphy, P, Shortt, S. and Hewitt, M. 2020. *Ten High Impact Actions for Integrated Care System Success* London: NHS Confederation.

Canadian Institute for Health Information (CIHI) 2019. Health Spending. Available at https://www.cihi.ca/en/health-spending#:~:text=In%202019%2C%20total%20health%20expenditure,report%20National%20Health%20Expenditure%20Trends.

Das-Thompson, J. McQuade, K, Pett, W., and Ville, N. 2020. *The future of integrated care in England Health leaders' views on how to make system working a success* London: NHS Confederation.

HIMSS Analytics 2020. *The Clinically Integrated Supply Outcomes Model* (CISOM). Available at HIMSS Analytics Clinically Integrated Supply Outcomes Model Information (emailhimss.org)

Humphreys, A. 2020. *What happened when five million medical masks for Canada's COVID_19 fight were hijacked in China.* National Post. Available at https://nationalpost.com/news/what-happened-when-five-million-medical-masks-for-canadas-covid-19-fight-were-hijacked-at-an-airport-in-china

Leonards, A. 2020. How Covid-L9 is disrupting inventory management. *Logistic Manager* May 2020.

National Audit Office 2020a. *Investigation into government procurement during the COVID-19 pandemic.* HC**:** 959, 2019-21.

National Audit Office 2020b. *The supply of personal protective equipment (PPE) during the COVID-19 pandemic* HC: 961, 2019-21.

National Audit Office 2020c. *Digital transformation in the NHS* HC: 317, 2019-21

Park, C., Kim, K., Roth, S., Beck, S., Kang, J, Tayag, M., and Griffin M. 2020 *Global Shortage of Personal Protective Equipment amid COVID-19: Supply Chains, Bottlenecks, and Policy Implications*. Asian Development Bank Brief. http://dx.doi.org/10.22617/BRF200128-2.

Patel, A., D'Alessandro, M., Ireland, J., Burel, K., Wencil, E., and Rasmussen S. 2017. Personal Protective Equipment Supply Chain: Lessons Learned from Recent Public Health Emergency Responses. *Health Security.* 15(3): 244-253.

Public Accounts Committee 2020. Readying the NHS and social care for the COVID-19 peak HC 405.

Snowdon, A. and Alessi, C. 2018 *Visibility: The new value proposition for Health Systems* Windsor Canada: World Health Innovation Network.

Snowdon, A., Axler, R., DeForge, R., St Pierre, M., and Kolga, C. 2019. Innovation procurement in health systems.: Exploring practice and lessons learned. *Healthcare Quarterly* 22(3), 34-36.

Snowdon, A. and St Pierre M. 2020. *The impact of COVID-19 on Canada's Healthcare Systems: An opportunity for Federal Supply Chain Coordination and Transformation*. World Health Innovation Network.

Snowdon, A., and Wright, A. 2018 Case Study: Supply Chain Transformation in the Alberta Health Services. Healthcare Quarterly 21(3) October 2018: 34-36.