


ARTICLE

Understanding public procurement within the health sector: a priority in a post-COVID-19 world

Anna García-Altés¹, Martin McKee^{2*} , Luigi Siciliani³, Pedro Pita Barros⁴, Lasse Lehtonen⁵, Heather Rogers^{6,7}, Dionne Kringos⁸, Jelka Zaletel⁹ and Jan De Maeseneer¹⁰

¹Catalan Health System Observatory, Agency for Health Quality and Assessment of Catalonia, Barcelona, Spain, ²Department of Health Services and Policy, London School of Hygiene & Tropical Medicine, London, UK, ³Department of Economics and Related Studies, University of York, York, UK, ⁴Nova School of Business and Economics, Universidade de Nova de Lisboa, Lisboa, Portugal, ⁵Helsinki University Hospital, University of Helsinki, Helsinki, Finland, ⁶Biocruces Bizkaia Health Research Institute, Barakaldo, Spain, ⁷IKERBASQUE Basque Foundation for Science, Bilbao, Spain, ⁸Amsterdam UMC, Department of Public and Occupational Health, Amsterdam Public Health Research Institute, University of Amsterdam, Amsterdam, the Netherlands, ⁹National Institute of Public Health Slovenia and University Medical Center, Ljubljana, Slovenia and ¹⁰Department of Public Health and Primary Care, Ghent University, Ghent, Belgium

*Corresponding author. Email: martin.mckee@lshtm.ac.uk

(Received 3 July 2021; revised 20 May 2022; accepted 29 June 2022; first published online 27 July 2022)

Abstract

Every year, over 250,000 public authorities in the European Union (EU) spend about 14% of GDP on the purchase of services, works and supplies. Many are in the health sector, a sector in which public authorities are the main buyers in many countries. When these purchases exceed threshold values, EU public procurement rules apply. Public procurement is increasingly being promoted as a tool for improving efficiency and contributing to better health outcomes, and as a policy lever for achieving other government goals, such as innovation, the development of small and medium-sized enterprises, sustainable green growth and social objectives like public health and greater inclusiveness. In this paper, we describe the challenges that arise within health care systems with public procurement and identify potential solutions to them. We examined the tendering of pharmaceuticals, health technology, and e-health. In each case we identify a series of challenges relating to the complexity of the procurement process, imbalances in power on either side of transactions and the role of procurement in promoting broader public policy objectives. Finally, we recommend several actions that could stimulate better procurement, and suggest a few areas where further EU cooperation can be pursued.

Key words: e-Health; health technology; pharmaceuticals; public procurement

1. Introduction

Every year, over 250,000 public authorities in the European Union (EU) spend about 14% of GDP (about €2 trillion) on the purchase of services, works and supplies. Many are in the health sector, where public authorities are the main buyers in many countries. They do so under rules set out in Public Procurement Directive 2014/24/EU ‘on public procurement and repealing Directive 2004/18/EC’ and Directive 2014/23/EU ‘on the award of concession contracts’ (European Union, 2004, 2014a, 2014b). In short, when a contracting authority concludes a works, supply or services contract for a monetary value exceeding defined financial thresholds, these Directives apply. They aim to promote transparency, equal treatment and non-discrimination, while also acting as a mechanism to promote the Europe 2020 strategy to achieve smart, sustainable and inclusive growth.

Public procurement has increasingly been promoted as a tool for combining efficient purchasing with achievement of better health outcomes (Kastanioti *et al.*, 2013; Mudyarabikwa and Regmi, 2016). This should be achieved by selecting, through the procurement process, the Most Economically Advantageous Tender (MEAT), making use of appropriate health indicators in the selection criteria. At present, different types of award criteria are used, either separately or in combination, related to price, costs (to the purchaser beyond the price paid) and quality, with considerable flexibility in how these are defined. Thus, costs can include those over the entire life cycle of what is being procured (Kirkham *et al.*, 2002; Stevanovic *et al.*, 2019). Quality can, among others, be assessed in terms of technical aspects of the product, expertise of the staff performing the contract or after-sales service (Risso-Gill *et al.*, 2014; Rhode, 2019; Zozaya González *et al.*, 2020). However this flexibility has implications; those engaged in procurement must have a detailed knowledge of the need that is to be addressed and what, among many possible trade-offs, is the best solution. While some challenges can be found in all sectors, they can be particularly problematic in the health sector.

Public procurement is increasingly being promoted as a tool for improving efficiency and contributing to better health outcomes, and as a policy lever for achieving other government goals, such as innovation, the development of small and medium-sized enterprises, sustainable green growth and social objectives like public health and greater inclusiveness. Yet until the COVID-19 pandemic, arguably, procurement was relegated to the fringes of discussion on health policy. This has changed, following problems in obtaining many of the products required to respond to the pandemic, such as personal protective equipment, test kits and vaccines. This experience pointed to widespread misunderstanding of the rules involved (McEvoy and Ferri, 2020). For all these reasons, it is especially timely to revisit this issue that has risen high on the political agenda in Europe. In this paper, we first describe the challenges that arise within health care systems with public procurement. We then examine the tendering of pharmaceuticals and health technology. In each case we identify a series of challenges relating to the complexity of the procurement process, imbalances in power on either side of transactions and the role of procurement in promoting broader public policy objectives. Lastly, we discuss how procurement can be improved, and suggest a few areas where further EU cooperation can be pursued.

2. Methods

This paper builds on and extends a report written by the European Commission's Expert Panel on Effective Ways of Investing in Health (European Commission, 2021e). The panel is an interdisciplinary, independent group selected by open competition to provide non-binding independent advice on matters related to effective, accessible and resilient health systems. It has 17 members who, in the current term, all come from different countries. They span a diverse range of areas, including clinical and laboratory medicine, health policy, health economics and health services research.

The panel's report was written in response to a request by the European Commission to report on opportunities and challenges to public procurement in the health sector in the EU (Expert Panel on Effective Ways of Investing in Health, 2021b). Following initial discussions to refine the question, including boundaries and components, we identified three questions. First, to what extent is the health sector different from other sectors when it comes to public procurement? Second, how do any specificities apply to the two main categories of products that are procured, pharmaceuticals and medical technology? Third, what can be done to improve the quality of procurement? To answer these questions we undertook a scoping review on the topic of public procurement, reviewing its legal basis, relevant theory and empirical evidence of its application. Of necessity, given the complexity of the topic, this involved an iterative approach with the evidence being brought together in narrative form. A subgroup of the Expert Panel (the authors) explored concept definitions, frameworks, methodologies, drawing on the scientific and grey

literature including reports from international organisations, professional bodies and the media. Draft versions of the opinion were shared with the broader Expert Panel in plenary meetings to incorporate their professional experiences in health system policy, practice and research. The resulting opinion was discussed in a public hearing and improved accordingly.

By answering these questions, this paper brings together what is a relatively disparate literature on the characteristics of public procurement within the health sector, bringing together insights from research that deals specifically with aspects of procurement and literature on relevant issues that relate to the things being procured. This is especially timely given well-known failures of procurement during the COVID-19 pandemic. The opinion, on which it is based, is currently feeding into discussions within the European Commission on this issue.

Finally, although it is discussed in the main report of the Expert Panel (Expert Panel on Effective Ways of Investing in Health, 2021b), we do not here examine in detail the Joint Procurement Agreement, a mechanism introduced in 2014 to enable collaboration among EU Member States in the event of a pandemic or similar crisis. This is because it would not be possible to deal with it adequately within the space available and because it has been addressed in detail by others elsewhere (McEvoy and Ferri, 2020).

3. Is the health sector different?

3.1 Monopoly providers and high transaction costs

A first set of issues relates to the characteristics of the market for products in the health sector. Procurement is ‘the process of finding and agreeing to terms, and acquiring goods, services, or works from an external source, often via a tendering or competitive bidding process’ (Laffont and Tirole, 1993). The Directive 2014/24/EU describes it as ‘one of the *market-based instruments* to be used to achieve smart, sustainable and inclusive growth while ensuring the most efficient use of public funds’ (European Union, 2014). Often, procurement does take place in a competitive market. However, it can still operate where there is limited or no competition, as is often the case in smaller countries where there is limited international trade in the products in question (Nemec *et al.*, 2020). This is important in health systems in several respects. First, many products purchased in the health sector are produced by monopoly providers. This is especially the case with medicines (Expert Panel on Effective Ways of Investing in Health, 2018). Thus, pharmaceutical companies are incentivised to invest in research and development by rules giving them exclusive rights to the intellectual property generated for 20 years after filing a patent, with provisions for extension in certain circumstances. During this time competitors cannot enter the market. Even when this period has expired, competitors may choose not to, for example where the market is small or where they face substantial regulatory hurdles. Of course, in many cases patents are not incompatible with competition between different products that satisfy the same health care need.

Second, the call for tenders may specify a reserve (or base) price, the highest price the purchaser is willing to pay. The benefits to the purchaser, faced with a fixed budget, are clear but it may inhibit potential providers from bidding. This may arise if the reserve price is low and, especially, if other provisions transfer risk to the provider, for example where the nature of what is being purchased is difficult to specify in a verifiable way (i.e. that can be observed by a third party). In these circumstances, there may be high transaction costs from specifying and evaluating what is offered. This consideration and the previous one together decrease the attractiveness of the procedure to potential participants and, while neither is specific to health systems, they are particularly common in them.

A further issue relates to high transaction costs, especially when contracts are renewed frequently. The concept of public procurement assumes that open competition will encourage new market entrants, providing more innovative products at lower cost. However, frequent switches to a new provider may involve set-up costs, for example the transfer of patient records to a new data system, or information to patients telling them that they should obtain care from a

different provider. Again, while not specific to health care, it assumes particular importance because it risks creating disruption for patients who interact with the system, some of whom may be vulnerable and placed at risk by any interruption of services. Contracting with the same provider over a prolonged period of time thus offers certain benefits, especially where it is associated with trusted relationships that permit less expensive contract monitoring processes to be employed, but may limit market entry by competitors.

These features point to several issues with public procurement in the health sector that must be addressed. The first is the administrative cost involved. In principle, the cost of writing the tender document, evaluating it, undertaking due diligence on any potential providers, negotiating a new contract and monitoring its implementation should be outweighed by the savings incurred. Where any of these is complicated, this may not be the case. A related issue is the ability of the purchaser to specify in sufficient detail the quality of the good or service being purchased, while leaving sufficient flexibility for the provider to adapt to changing circumstances.

A second relates to the rapidity with which a contract can be executed. There will be times, for example in a pandemic, when speed is of the essence (Vlček, 2018). The negotiated procedure without prior publication may be used where public procurement rules designed to build in adequate time for potential providers to respond is insufficient. However, there are trade-offs involved, as hasty processes may lead to sub-optimal outcomes, including corruption (Teremetskyi *et al.*, 2021).

Finally, there is the problem of asset specificity. When a new contract is agreed, the provider may have to invest considerable resources in the means to deliver it and the assets produced might not be usable for a different purpose. Thus, they will find a way to recoup the costs within the first contract period as they cannot be sure it will be renewed. This will tend to increase the price. Similarly, a purchaser seeking an alternative provider in the next contract round must accept additional costs if another firm has to make the same investment. Thus, asset specificity may require long-term relationships to maintain incentives for investment, but this is incompatible with the requirement to lower barriers to market entry.

3.2 Life-cycle costing

When purchasing equipment, it is important to consider not only the upfront costs, but also those that will accrue throughout its lifetime. Thus, the tender process should include a mechanism by which all future cost components can be quantified, including operation, maintenance and consumables. There are well-established techniques for 'life-cycle costing' referred to in the Directive (European Union, 2014). However, there is an inevitable uncertainty when estimating long-term costs of technologies, given changing patterns of disease and clinical indications, potential substitutions due to technological progress, productivity changes and decreasing learning costs. This is especially the case where new technology, as it increasingly does, comes in the form of bundled products, for example as combinations of medicines and monitoring systems, diagnostic equipment and operating contracts or telemetry devices and remote monitoring. These bundles pose particular challenges for those estimating lifetime costs given the high degree of asset specificity and potential for changes in patterns of disease or technological advances that make existing equipment obsolete.

3.3 Interoperability

Lack of interoperability of equipment, and particularly information technology is problematic (Pronovost *et al.*, 2018; Kuoppamäki, 2021). In the latter case it is the ability of two or more systems or components to exchange information and to use the information that has been exchanged (Sheikh *et al.*, 2021). It has two elements, technical, referring to the ability to move the information, and semantic, which is the ability to understand it. Problems of interoperability came to the fore during the COVID-19 pandemic when, for example, contact tracing Apps developed for Android phones could not work on iPhones (Du *et al.*, 2020).

There have been several initiatives to address this but there are major barriers. These include lack of agreement on standards; divergent incentives and agendas among vendors and disparate and inconsistent characteristics in purchasing strategies and practices. In practice, interoperability is still very low on the agenda and a product that in other respects is superior may be incompatible with existing systems. This contrasts with other sectors where it is relatively highly developed, often out of necessity. For example, the ability of mobile phones to move across different networks has demanded common standards. The same is true of the banking industry, allowing customers to obtain cash from different companies' ATMs. For this to happen in the health sector, however, will require leadership that brings purchasers and providers together to commit to the achievement of interoperability, identifying goals and requirements, and developing mechanisms for collaboration on common standards and specifications (European Commission, 2014). It will also be important to ensure that those providers committing to interoperability are rewarded, for example by including a requirement that systems be interoperable within tender documents.

3.4 Technical performance

Pharmaceuticals are subject to rigorous evaluation before being placed on the market. However, many forms of technology (such as medical devices) do not go through the same process of evaluating their technical performance, other than to establish their safety. Moreover, even when such information is available it seems that it is rarely used. A recent Swedish study of procurement of health and welfare technologies found that relevant evidence was used in under a fifth of tenders (Richardson *et al.*, 2022).

An area of particular concern is the growth of mobile health (mHealth) applications. The number of mHealth applications on the market is increasing rapidly. While they offer many advantages, especially in terms of patient empowerment, few have been subject to any formal evaluation of their ability to produce health gain. One problem is the frequent failure to collect and analyse evidence on a product's performance over time, principally because data systems and information infrastructure do not support this. In this respect, there are opportunities for greater use of patient-reported measures. Health information systems are good at collecting data on health care activity, but often lacking when it comes to collecting information on the outcomes of this activity. Some have begun to capture different types of Patient-Reported Measures – PROMs (Outcomes), PREMs (Experience) and PRIMs (clinical safety Incidents) (De Rosi *et al.*, 2020). In the near future, the use of Real World Data with information coming from multiple and diverse sources could play a role in generating outcome measures (e.g. although this should not preclude the rigorous evaluation required for approval of pharmaceuticals) (Löblová *et al.*, 2019). However, such data, along with evaluations of characteristics such as ease of use, accuracy and acceptability to health care workers, can inform procurement decisions (Huddy *et al.*, 2019).

3.5 Application of MEAT Criteria

Given these issues, there are several particular challenges with application of the MEAT criteria for procurement. Silo budgeting is one of the greatest barriers to applying MEAT, even if decision-makers are theoretically supportive of taking a value-based approach (Expert Panel on Effective Ways of Investing in Health, 2019). It is difficult for procurement officials to spend more this year if the benefits show up on someone else's balance sheet now or at some point in the future. In addition, political cycles tend to be short so there is no incentive for policy-makers to take a long-term view. A mechanism to incentivise the use of a broader approach to measuring value, with a clear signal from policymakers, is needed. Otherwise, it makes public procurement a very difficult mean to achieve health outcomes which are usually seen after several years. Finally, there are challenges in measuring value. Trying to monetise value and weigh long-

term benefits or broader socio-economic factors is difficult. The longer the time frame, the greater the uncertainty but in some specific cases a degree of risk-sharing between supplier and purchaser can mitigate this uncertainty.

3.6 Beyond the health sector

The health sector represents a substantial share of the overall economy in many places and the decisions it makes when procuring products and services can have implications that go beyond its boundaries. Increasingly it is seen as a potential lever for achieving policy goals, such as innovation, regional development, growth of small and medium enterprises (SMEs) and environmental goals (Edquist *et al.*, 2015). A 2015 OECD Survey on Strategic Procurement for Innovation documented the growing inclusion of procurement to support innovation has been included in national or sub-national innovation strategies (OECD, 2017). Green public procurement has been defined by the European Commission as a ‘process whereby public authorities seek to produce goods, services, and works with a reduced environmental impact through their life cycle when compared to goods, services, and works with the primary function that would otherwise be procured’ (European Commission, 2008). These considerations can be incorporated into procurement through inclusion and technical specifications, award criteria and contract performance conditions (Testa *et al.*, 2016; Fuentes-Bargues *et al.*, 2017, 2019). SMEs can be supported through innovation partnerships, such as one in Lombardy that identified three areas of innovation that could be met by local suppliers, automated equipment for moving beds and stretchers, Information and Communications Technology (ICT)-based remote systems for control, monitoring and home assistance to disabled and chronically ill people and robotic systems for blood sampling (Vecchiato and Roveda, 2014).

4. How do these issues apply to particular health care products?

Drawing on the preceding analysis, the challenges that apply to procurement of different purchases that are made in the health sector can be placed in three broad categories, none of which are exclusive to the health sector but each of which have particular relevance to it. They include the complexity of the transaction, the imbalance of power between the procurer and the provider, and the contribution of public procurement to other policy objectives. We now explore these as they apply to pharmaceuticals and health technology.

4.1 Pharmaceuticals

In the vast majority of cases, procurement of pharmaceuticals is straightforward and there is clear guidance from the World Health Organization on best practices (Table 1), with several elements already enshrined in EU procurement and other single market law, designed to ensure transparency, equal treatment, proportionality and mutual recognition. However, pharmaceuticals have several characteristics that make transactions complex. First, those involved in protecting and improving health (hospitals, primary care centres, health professionals, etc.) require very large numbers of product lines. The number of unique medicines has increased dramatically and, while some can be substituted for others, increasing targeting of individual molecules means that ever greater numbers of medicines have a unique mode of action. To add to the problem, the demand for individual product lines can often be difficult to predict (De Maeseneer and Boeckxstaens, 2012).

A second set of complex transaction problems arises especially, but not exclusively, when procuring products that are new to the market (Expert Panel on Effective Ways of Investing in Health, 2018), with a growing number being offered at high prices. Current solutions involve developing policies to contain pharmaceutical costs, including overall budget constraints or spending caps. Possible future directions involve earmarking funds for medicines used in

Table 1. Features of successful procurement of pharmaceuticals

• Transparency – contract procedures must be transparent and contract opportunities should generally be publicised;
• Equal treatment and non-discrimination – potential suppliers must be treated equally;
• Proportionality – procurement procedures and decisions must be proportionate to the goals being pursued;
• Mutual recognition – giving equal validity to qualifications and standards from other member states, where appropriate.
Key elements that are expected to lead to a good procurement outcome:
• Reliable payment and good financial management;
• Procurement by generic name (international non-proprietary name);
• Procurement limited to essential medicines list or formulary list;
• Formal supplier qualification and monitoring;
• Competitive procurement;
• Monopsony commitment;
• Order quantities based on reliable estimates of actual need;
• Transparency and written procedures;
• Separation of key functions;
• A product quality assurance programme;
• Annual financial audits with published results;
• Regular reporting on procurement performance.

Source: WHO EURO (2016).

particular settings (e.g. oncology) with caps beyond which companies selling products financed through these funds are required to pay rebates. However, it is also necessary, especially in countries where the pharmaceutical industry is a major player in the economy, to take account of the need to incentivise innovation. This is a very complex area that goes far beyond the scope of this paper. Reports of shortages of medicines, even in advanced industrialised countries (Goldsack *et al.*, 2014; EAHP, 2018), offer further evidence of the complexity of their procurement.

Medicine shortages also highlight the challenge regarding power imbalance. Distortions of the market, such as exploitation of a dominant position by manufacturers to increase prices or divert supplies to more lucrative purchasers, or even withdrawal entirely from the market, can occur (Van Malleghem and Devroe, 2013; Wickware, 2020). A high proportion of medicines that are used have been on the market for many years, with many having lost their patented protection. Often, there will be a number of providers of a generic medicine and, even when patents have not yet expired, there may be scope for substitution of medicines within classes. One factor to consider when agreeing a contract is the security of supply, especially where manufacturers have outsourced manufacture or depend on complex arrangements for obtaining components, creating a risk of shortages. In practice, it is quite difficult for the purchaser to ensure that there will not be problems in the availability of the purchased pharmaceutical product during the contract period (Ferner *et al.*, 2019). Finally, even though, in theory, there are few barriers to the market entry when shortages do occur, evidence of profiteering with generic medicines shows that this is a real problem (Wouters *et al.*, 2017; Competition and Markets Authority, 2016).

Pharmaceutical pricing is high on the policy agenda because expenditure on medicines comprises a substantial share of health budgets. While comparisons should be undertaken with caution, the most recent data collected by OECD reports figures ranging from 6.4% of health spending (Denmark) to 34.4% (Bulgaria) (OECD, 2022). The corollary of this is that the pharmaceutical industry is an extremely important player in the economy. There is a tension between ensuring the sustainability of an industry that can reap the rewards of innovation while at the same time providing medicines that are affordable (OECD, 2020). This is complicated because of uncertainty about the true costs of research and development, reflecting a lack of transparency (Wouters *et al.*, 2020).

4.2 Health technology

In many cases, procurement of health technology is straightforward. There are agreed technical specifications for many of the more commonly used items. Once purchased, running costs are relatively low as a proportion of the initial outlay. Maintenance is also often straightforward. However, there are situations where this is not the case. Transactions become increasingly complex. Complex health technology is bundled with services, or requires large volumes of consumables, giving the manufacturer a powerful incentive to limit the potential for substitution with cheaper versions. There may also be substantial running costs and costs of disposal when the equipment is replaced. An extreme example is where it contains radioactive material. For these reasons, it is important to employ life-cycle costing, while recognising that this involves considerable uncertainty, especially where the item is expected to be in use for a long period.

Another example of the complexity of the transaction is the inclusion of quality or non-price dimensions, with purchasers not only deciding what criteria to use but how to weight them. The public procurer must know the product very well before designing the tender specifications and thus the award criteria. As noted previously, MEAT can include a wide range of criteria, including aesthetic and functional characteristics, consumer service, technical assistance, environmental sustainability and disposal costs. However, operationalising these criteria and allocating scores against them can be a very complex task, involving many difficult judgements. Each acquisition may have to develop its own set of weights and indicators, increasing transaction costs. Also, use of multiple criteria can lead to a situation where none of the criteria is significant in reaching the decision. There are, however, a number of examples in the literature that can be drawn upon to show what is possible. Some of these are described in Table 2 (Gerecke *et al.*, 2015).

Other considerations, such as acceptability to staff and patients, go beyond the usual technical assessments that are available to the purchasers. When procuring e-health solutions the selection process must be able to ensure that the clinical and technical needs are addressed while taking account of the corresponding regulatory and financing contexts (Mathews *et al.*, 2019). Recent examples of such complexity can be found in accounts of purchasing electronic health records systems (Hertzum and Ellingsen, 2019). Except in the most straightforward cases, purchasers are likely to require assistance from specialist procurement advisors. The identification, description and mapping, in an interdisciplinary way, of the organisational complexity and care pathways of the hospital or care system will be key in the process of procurement process of an e-health solution. This includes assessment of the compatibility of the e-health solution with the billing and regulatory policies of the care system or state where the solution should be implemented (Snowdon *et al.*, 2019). As a consequence, the transaction costs may increase, especially if this is the first time the product is being procured or if the purchaser is not drawing on experience of others that have been in this position. It will be necessary to make a judgement as to whether the benefits of the increased evaluation that is required outweigh the costs of undertaking it, recognising that a poor procurement may cost more in the long run, especially if it has to be repeated.

Beyond these criteria, it is possible to include social and environmental criteria. This adds a further level of complexity and, while there may be sound policy reasons for taking them into

Table 2. Public procurement processes that have applied wider MEAT criteria

Institution, year	Technology	Quality criteria
Stockholm County Council, 2012	Wound care products	Total cost of treatment and rate of complications avoided
Norway regional health authority, 2011	IV catheters	Low level of patient-reported pain, ease-of-use and perceived safety in handling
Karolinska University Hospital, 2014	14-year tender for imaging services (including MRI, ultrasound and CT scanners)	Maintenance of technical standards over the entire contract and details related to service, upgrades and replacement scanners
Canadian Provincial Health Authority, 2014	Pacemakers, implantable cardioverter defibrillators and cardiac resynchronisation therapy devices over a 4-year period	Expected life span of the devices, including battery depletion
Hospital Clínic Barcelona, 2017	TAVI, diapers and underpads	TAVI: incidence of complications Diapers and underpads: not developed yet

Source: Gerecke *et al.* (2015).

account, the cost of doing so will fall on the purchaser while the benefits accrue to society as a whole. For this reason, it is unlikely that they will be included unless there is a requirement, normally embedded in legislation or regulations, as in Sweden (Streng, 2018). Otherwise there will be the risk of free riders.

5. How can we improve procurement?

The previous sections have identified a series of challenges that must be addressed. Here we will examine some of the solutions that have been proposed but first we have attempted to summarise some of the issues in Table 3.

Experience during the pandemic has given a sense of urgency to finding new approaches to public procurement in Europe in an emergency (Anderson *et al.*, 2020; Forman *et al.*, 2020). There were many accounts of shortages of personal protective equipment in particular (Bramstedt, 2020; Halloran, 2021). The European Commission issued guidance highlighting the flexibilities contained within the procurement directives but these were felt by many to be insufficient (European Commission, 2020, 2020a, 2020b). The situation was complicated by

Table 3. Selected challenges and possible solutions

Challenge	Possible solution
Shortage of procurement skills	Training, creation of communities of practice
Methodological weaknesses	Development of tools and methodologies
Sustainability	Life-cycle costing, green public procurement
Corruption	Transparency, oversight, accountability
Innovation	Public procurement for innovation, pre commercial procurement
Promoting growth	Innovation partnerships

numerous scandals, as individuals in many countries took advantage of the prevailing confusion (Hecklen *et al.*, 2020; McKee, 2020; Telles, 2020). As noted above, after some initial problems, the EU's Joint Procurement Agreement, established in 2014, has been seen as relatively successful. Its characteristics, strengths and weaknesses have been examined in detail by McEvoy and Ferri (2020). In contrast, the European vaccine procurement initiative has experienced major problems (de Ruijter, 2021). Some of the problems identified are meant to be addressed by the new Health Emergency Preparedness and Response Authority (HERA) (Anderson *et al.*, 2021). Its 2022 Work Plan sets out several proposals to address weaknesses in the existing systems (European Commission, 2022).

Even before the experience the pandemic was understood, the European Commission had developed several initiatives to address some of the challenges discussed. For instance, a tender (PJ-02-2020) to examine Health care Public Procurement in the EU was published on 3 March 2020 and closed on 6 August 2020 (European Commission, 2020b). One part of the CHAFAEA Annual Work Programme 2020 of the 3rd EU Health Programme (European Commission, 2020d) seeks to provide a platform for discussion and research on public procurement in the health sector. To address challenges in innovation procurement, the European Commission sees two complementary solutions: Public Procurement of Innovative solutions (PPI), for when challenges can be addressed by innovative solutions that are nearly in the market or present in small quantities and do not need new Research & Development, and Pre-Commercial Procurement (PCP), for when no near-to-the-market solutions exist and new research and development are needed. PCP offers a means to compare the advantages and disadvantages of alternative approaches (European Commission, 2021c), thereby identifying the most promising innovations through the stages of solution design, prototyping, development and first product testing (European Commission, 2020c). The EC financed many joint-national projects and co-financed numerous coordination and networking projects involving these solutions. The financing mechanisms range from FP7, Horizon Europe, and European Structural and Investment Funds (ESIF) (European Commission, 2021f). Those engaged in procurement may benefit from the European Assistance For Innovation Procurement initiative, which provides free technical and legal assistance to individual procurers to implement PCPs and PPIs (European Assistance For Innovation, 2020). Potential partners may be able to benefit from InnovFin or EU Finance for Innovators, support from the European Investment Bank (European Investment Bank, 2020). There is also guidance on how to avoid common errors and adopt best practices in public procurement of projects funded by the ESIF (European Commission, 2020a). The European Assistance For Innovation Procurement Initiative provides free of charge technical and legal assistance to individual procurers to implement PCPs and PPIs (European Commission, 2021d).

There has been growing recognition that those undertaking public procurement require specialised skills and competencies (OECD, 2011). These include a detailed understanding of the organisation of health services, including the complex interrelationships between different groups of health workers, changing technology and advances in models of care. The importance of recruiting, developing and retaining such individuals cannot be underestimated. This requires a cadre of professionals who possess a wide range of skills and competencies, including negotiation, project management and risk management skills (Edquist *et al.*, 2015; OECD, 2019). There are several examples where public bodies have come together to pool expertise, in some cases with reports of efficiency gains (Hebert, 2011). It also requires a new approach to management, with an organisational culture that values initiative and risk-taking (OECD, 2017). These considerations have informed the 2017 Commission Recommendation on the professionalisation of public procurement (European Commission, 2017). Tools and methodologies to support professional procurement practice should be implemented, in particular e-procurement, with IT solutions that can enhance access to information, provide economies of scale and promote standardisation and interoperability. The systems should also promote integrity, by implementing mechanisms to ensure compliance and transparency.

There is also a need to systematise the knowledge that already exists regarding public procurement in the health sector and related purchasing tasks, such as sourcing, and a need to promote rigorous evaluation of existing and future procurement processes in the health sector. In particular, evaluation should focus on the impact on health (at individual patient or aggregate population levels) (Expert Panel on Effective Ways of Investing in Health, 2021a, 2021b).

There is a strong case for a ‘community of practice’ to share examples of best practice. For instance, The European Commission Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) has encouraged the sharing of best practices among Member State public authorities via regular meetings of an Expert Group on Public Procurement (European Commission, 2021g). A sub-group on Health Public Procurement was created in July 2020. It is imperative that such ‘communities of practice’ draw together a wide range of disciplinary perspectives, offer evidence for impact of best practices on health, and engage in dissemination beyond national contact points to ensure that regional decision makers, who often have autonomous public procurement decision making authority, are adequately informed. Furthermore, various EU programmes, such as ERASMUS+, can be leveraged to facilitate interchange of staff between public purchasing agencies.

Finally, while one of the objectives of public procurement is to reduce the opportunity for collusion or corruption, in practice it does not always succeed (Hessami, 2014; Kohler and Dimancesco, 2020) and there were many examples during the COVID-19 pandemic (Teremetskyi *et al.*, 2021). Thus, it is important to put in place specific anti-corruption and governance tools focused on transparency, oversight and accountability. Transparency, in particular, is one of the most important means for preventing corruption in the public sector (Vian, 2020) and its importance has come to the fore during the COVID-19 pandemic, which has given rise to numerous abuses (Cavallaro, 2020; Europol, 2020).

6. Conclusions

This paper has highlighted the challenges of public procurement and, while its focus has been on the specific issues that arise in the health sector, many of them also apply, to varying degrees, in other sectors. Although some European-wide initiatives exist, they must be evaluated if effectiveness at improving public procurement procedures and health expanded. New strategies are needed to ensure public procurement in the health sector addresses existing challenges.

Conflict of interest. This paper is based on a report prepared within the framework of the European Commission’s Expert Panel on Effective Ways of Investing in Health. There are no competing interests directly related to this paper. A full list of competing interests of panel members is available at <https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?do=groupDetail&groupID=2847>.

References

- Anderson M, McKee M and Mossialos E (2020) COVID-19 exposes weaknesses in European response to outbreaks. *BMJ* 368, m1075.
- Anderson M, Forman R and Mossialos E (2021) Navigating the role of the EU health emergency preparedness and response authority (HERA) in Europe and beyond. *The Lancet Regional Health – Europe* 9, 100203.
- Bramstedt KA (2020) COVID-19 and the death of Italy’s physicians. *Progress in Transplantation* 30, 290–291.
- Cavallaro F (2020) *Palermo: corruzione e appalti pilotati nella sanità, tra gli arrestati anche manager COVID* – *Corriere.it*. Corriere della sera, 2020-05-21 2020 [cited 23rd June 2020]. Available at https://www.corriere.it/cronache/20_maggio_21/palermo-corruzione-appalti-pilotati-sanita-gli-arrestati-anche-manager-covid-b6f70404-9b21-11ea-b206-e08ec5340715.shtml.
- Competition and Markets Authority (2016) *Unfair pricing in respect of the supply of phenytoin sodium capsules in the UK Case CE/9742-13 20162021*. Available at <https://assets.publishing.service.gov.uk/media/594240cfe5274a5e4e00024e/phenytoin-full-non-confidential-decision.pdf>.
- De Maeseneer J and Boeckstaens P (2012) James Mackenzie Lecture 2011: multimorbidity, goal-oriented care, and equity. *The British Journal of General Practice* 62, e522–e524.

- De Rosis S, Cerasuolo D and Nuti S** (2020) Using patient-reported measures to drive change in healthcare: the experience of the digital, continuous and systematic PREMs observatory in Italy. *BMC Health Services Research* **20**, 315.
- de Ruijter A** (2021) How the EU vaccine troubles could have partially been prevented ten years ago. *The Lancet Regional Health – Europe* **3**, 100083.
- Du L, Raposo VL and Wang M** (2020) COVID-19 contact tracing apps: a technologic Tower of Babel and the gap for international pandemic control. *JMIR Mhealth and Uhealth* **8**, e23194.
- EAHP** (2018) *EAHP's 2018 Survey on Medicines Shortages to improve patient outcomes 2018* [cited 5th June 2020]. Available at <http://www.eahp.eu/practice-and-policy/medicines-shortages/2018-medicines-shortage-survey>.
- Edquist C, Vonortas NS, Zabala-Iturriagoitia JM and J Edler** (eds) (2015) *Public Procurement for Innovation*. Cheltenham, UK: Edward Elgar Publishing.
- European Assistance For Innovation, Procurement** (2020) *European Assistance For Innovation Procurement – EAFIP*. EAFIP 2020 [cited 29th June 2020]. Available at <https://eafip.eu/>.
- European Commission** (2008) *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions; Public Procurement for a Better Environment; COM (2008); European Commission*. Brussels: European Commission.
- European Commission** (2017) Commission recommendation (EU) 2017/1805 of 3 October 2017 on the professionalisation of public procurement – building an architecture for the professionalisation of public procurement. *Official Journal of the European Union* **259**, 28–31.
- European Commission** (2020) *Communication from the Commission Guidance from the European Commission on using the public procurement framework in the emergency situation related to the COVID-19 crisis 2020/C 108 I/01 2020* [cited 18th May 2022]. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.CI.2020.108.01.0001.01.ENG>.
- European Commission** (2020a) *Guidance on public procurement 2020* [cited 29th June 2020]. Available at https://ec.europa.eu/regional_policy/en/policy/how/improving-investment/public-procurement/guide/.
- European Commission** (2020b) *Healthcare public procurement in the EU (Heading 1.2.1.2 of the AWP 2020) 2020* [cited 29th June 2020]. Available at <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/pj-02-2020?cookies=disabled>.
- European Commission** (2020c) *Innovation Procurement 2020* [cited 29th June 2020]. Available at <https://ec.europa.eu/digital-single-market/en/innovation-procurement>.
- European Commission** (2020d) *3rd EU Health Programme. Call for project proposals under the Annual Work Programme 2020 (HP-PJ-2020) 2020* [cited 1st July 2021]. Available at https://ec.europa.eu/research/participants/data/ref/other_eu_prog/hp/call-fiche_hp-pj-2020_en.pdf.
- European Commission** (2021b) *EU funding opportunities for PCP and PPI 2021* [cited 30th June 2021]. Available at <https://digital-strategy.ec.europa.eu/en/eu-funding-opportunities-pcp-and-ppi>.
- European Commission** (2021c) *EU policy initiatives on Innovation Procurement 2014* [cited 30th June 2021]. Available at <https://ec.europa.eu/digital-single-market/en/news/eu-policy-initiatives-pcp-and-ppi>.
- European Commission** (2021d) *European Assistance for Innovation Procurement 2021* [cited 30th June 2021]. Available at <https://eafip.eu/>.
- European Commission** (2021e) *Expert Panel on effective ways of investing in health 2021* [cited 30th June 2021]. Available at https://ec.europa.eu/health/exp/overview_en.
- European Commission** (2021f) *Innovation procurement 2021* [cited 30th June 2021]. Available at https://ec.europa.eu/information_society/newsroom/image/document/2016-37/synergies_innovation_procurement_updatewp2017_16968.pdf.
- European Commission** (2021g) *Register of Commission Expert Groups and Other Similar Entities 2021* [cited 30th June 2021]. Available at <https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?do=groupDetail&groupDetail&groupID=2679>.
- European Commission** (2022) *HERA Work Plan 2022* [cited 18th May 2022]. Available at https://ec.europa.eu/health/publications/hera-work-plan-2022_en.
- European Investment Bank** (2020) *What InnovFin products are available and who can benefit from them? EIB 2020* [cited 29th June 2020]. Available at <https://www.eib.org/products/blending/innovfin/products/index.htm>.
- European Union** (2004) *Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts 2004* [cited 14th May 2021]. Available at <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32004L0018>.
- European Union** (2014a) *Directive 2014/23/EU of the European Parliament and of the Council of 26 February 2014 on the award of concession contracts Text with EEA relevance 2014* [cited 14th May 2021]. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AJOL_2014_094_R_0001_01.
- European Union** (2014b) *Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC Text with EEA relevance 2004* [cited 14th May 2021]. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0024>.
- EuroPol** (2020) *Corona crimes: Suspect behind €6 million face masks and hand sanitisers scam arrested thanks to international police cooperation 2020* [cited 29th June 2020]. Available at <https://www.europol.europa.eu/newsroom/news/corona-crimes-suspect-behind-€6-million-face-masks-and-hand-sanitisers-scam-arrested-thanks-to-international-police-cooperation>.

- Expert Panel on Effective Ways of Investing in Health** (2018) *Opinion on Innovative Payment Models for High-Cost Innovative Medicines*. Brussels: European Commission.
- Expert Panel on Effective Ways of Investing in Health** (2019) *Defining Value in 'Value-Based Healthcare'*. Brussels: European Commission.
- Expert Panel on Effective Ways of Investing in Health** (2021a) Innovative payment models for high-cost innovative medicines 2018 [cited 14th May 2021]. Available at https://ec.europa.eu/health/sites/default/files/expert_panel/docs/opinion_innovative_medicines_en.pdf.
- Expert Panel on Effective Ways of Investing in Health** (2021b) *Public Procurement in Healthcare Systems*. Brussels: European Commission.
- Ferner RE, Aronson JK and Heneghan C** (2019) Crisis in the supply of medicines. *BMJ* **367**, l5841.
- Forman R, Atun R, McKee M and Mossialos E** (2020) 12 Lessons learned from the management of the coronavirus pandemic. *Health Policy* **124**, 577–580.
- Fuentes-Bargues JL, González-Cruz MC and González-Gaya C** (2017) Environmental criteria in the Spanish public works procurement process. *International Journal of Environmental Research and Public Health* **14**, 204.
- Fuentes-Bargues JL, Ferrer-Gisbert PS, González-Cruz MC and Bastante-Ceca MJ** (2019) Green public procurement at a regional level. Case study: the Valencia region of Spain. *International Journal of Environmental Research and Public Health* **16**, 2936.
- Gerecke G, Clawson J and Verboven Y** (2015) *Procurement: The Unexpected Driver of Value-Based Health Care*. Boston, MA: Boston Consulting Group.
- Goldack JC, Reilly C, Bush C, McElligott S, Bristol MN, Motanya UN, Field R, Vozniak JM, Wong YN, Schwartz JS and Domchek S** (2014) Impact of shortages of injectable oncology drugs on patient care. *American Journal of Health-system Pharmacy: AJHP* **71**, 571–578.
- Halloran D** (2021) Procurement during a public health crisis: the role of the European Union. *Irish Studies in International Affairs* **32**, 67–81.
- Hebert G** (2011) Pooling procurement in the Belgian hospital sector. *World Hospitals and Health Services* **47**, 27–30.
- Hecken A, Larsen S and Fastrup N** (2020) *Masker for millioner kasseret på hemmeligt lager: Region svindlet under coronakrisen*. DR 2020 [cited 3rd July 2020]. Available at <https://www.dr.dk/nyheder/penge/masker-millioner-kasseret-paa-hemmeligt-lager-region-svindlet-under-coronakrisen>.
- Hertzum M and Ellingsen G** (2019) The implementation of an electronic health record: comparing preparations for epic in Norway with experiences from the UK and Denmark. *International Journal of Medical Informatics* **129**, 312–317.
- Hessami Z** (2014) Political corruption, public procurement, and budget composition: theory and evidence from OECD countries. *European Journal of political economy* **34**, 372–389.
- Huddy JR, Ni M, Misra S, Mavroveli S, Barlow J and Hanna GB** (2019) Development of the point-of-care key evidence tool (POCKET): a checklist for multi-dimensional evidence generation in point-of-care tests. *Clinical Chemistry and Laboratory Medicine* **57**, 845–855.
- Kastanioti C, Kontodimopoulos N, Stasinopoulos D, Kapetaneas N and Polyzos N** (2013) Public procurement of health technologies in Greece in an era of economic crisis. *Health Policy* **109**, 7–13.
- Kirkham RJ, Halim Boussabaine A and Awwad BH** (2002) Probability distributions of facilities management costs for whole life cycle costing in acute care NHS hospital buildings. *Construction Management & Economics* **20**, 251–261.
- Kohler JC and Dimancesco D** (2020) The risk of corruption in public pharmaceutical procurement: how anti-corruption, transparency and accountability measures may reduce this risk. *Global Health Action* **13**(suppl. 1), 1694745.
- Kuoppamäki S** (2021) The application and deployment of welfare technology in Swedish municipal care: a qualitative study of procurement practices among municipal actors. *BMC Health Services Research* **21**, 918.
- Laffont J-J and Tirole J** (1993) *A Theory of Incentives in Procurement and Regulation*. Cambridge, MA: MIT press.
- Löblöv O, Csanádi M, Ozierański P, Kaló Z, King L and McKee M** (2019) Alternative access schemes for pharmaceuticals in Europe: towards an emerging typology. *Health Policy* **123**, 630–634.
- Mathews SC, McShea MJ, Hanley CL, Ravitz A, Labrique AB and Cohen AB** (2019) Digital health: a path to validation. *NPJ Digital Medicine* **2**, 38.
- McEvoy E and Ferri D** (2020) The role of the joint procurement agreement during the COVID-19 pandemic: assessing its usefulness and discussing its potential to support a European health union. *European Journal of Risk Regulation* **11**, 851–863.
- McKee M** (2020) England's PPE procurement failures must never happen again. *BMJ* **370**, m2858.
- Mudyarabikwa O and Regmi K** (2016) Public-private partnerships and efficiency in public procurement of primary health-care infrastructure: a qualitative research in the NHS UK. *Journal of Public Health* **24**, 91–100.
- Nemec J, Kubak M, Krapek M and Horehajova M** (2020) Competition in public procurement in the Czech and Slovak public health care sectors. *Healthcare (Basel)* **8**, 201.
- OECD** (2011) *Demand-side Innovation Policies*. Paris: OECD Publishing.
- OECD** (2017) *Public Procurement for Innovation: Good Practices and Strategies*. Paris: OECD Publishing.
- OECD** (2019) *Reforming Public Procurement: Progress in Implementing the 2015 OECD Recommendation*, *OECD Public Governance Reviews*. Paris: OECD.
- OECD** (2020) *Addressing Challenges in Access to Oncology Medicines*. Paris: OECD.

- OECD (2022) *Pharmaceutical spending 2022* [cited 18th May 2022]. Available at <https://data.oecd.org/healthres/pharmaceutical-spending.htm>.
- Pronovost PJ, Johns ME, Palmer S, Bono RC, Fridsma DB, Gettinger A, Goldman J, Johnson W, Karney M, Samitt C, Sriram RD, Zenooz A and Wang YC (eds) (2018) *Procuring Interoperability: Achieving High-Quality, Connected, and Person-Centered Care*. Washington, DC: National Academy of Medicine.
- Rhode A (2019) *Public Procurement in the European Union: How Contracting Authorities Can Improve Their Procurement Performance in Tenders*. Wiesbaden: Springer Nature.
- Richardson MX, Landerdahl Stridsberg S and Wamala Andersson S (2022) Evidence-related requirements in Swedish public sector procurement of health and welfare technologies – a systematic review. *BMC Health Services Research* **22**, 357.
- Risso-Gill I, Legido-Quigley H, Panteli D and McKee M (2014) Assessing the role of regulatory bodies in managing health professional issues and errors in Europe. *International Journal for Quality in Health Care* **26**, 348–357.
- Sheikh A, Anderson M, Albala S, Casadei B, Franklin BD, Richards M, Taylor D, Tibble H and Mossialos E (2021) Health information technology and digital innovation for national learning health and care systems. *The Lancet Digital Health* **3**, e383–e396.
- Snowdon AW, DeForge R, Axler R, Pierre MS and Kolga C (2019) Case study: innovation procurement for a digital services platform. *Healthcare Quarterly* **22**, 26–29.
- Stevanovic M, Allacker K and Vermeulen S (2019) Development of an approach to assess the life cycle environmental impacts and costs of general hospitals through the analysis of a Belgian case. *Sustainability* **11**, 856.
- Streng A (2018) *Beaktande av sociala och miljömässiga hänsyn vid offentlig upphandling*. Åbo: Åbo Akademi.
- Telles P (2020) *COVID-19: Portugal is also flouting procurement rules to award contracts directly* 2020 [cited 1st July 2020].
- Teremetskiy V, Duliba Y, Kroitor V, Korchak N and Makarenko O (2021) Corruption and strengthening anti-corruption efforts in healthcare during the pandemic of COVID-19. *The Medico-Legal Journal* **89**, 25–28.
- Testa F, Grappio P, Gusmerotti NM, Iraldo F and Frey M (2016) Examining green public procurement using content analysis: existing difficulties for procurers and useful recommendations. *Environment, Development and Sustainability* **18**, 197–219.
- Van Malleghem P-A and Devroe W (2013) AstraZeneca: court of justice upholds first decision finding abuse of dominant position in pharmaceutical sector. *Journal of European Competition Law & Practice* **4**, 228–232.
- Vecchiato R and Roveda C (2014) Foresight for public procurement and regional innovation policy: the case of Lombardy. *Research Policy* **43**, 438–450.
- Vian T (2020) Anti-corruption, transparency and accountability in health: concepts, frameworks, and approaches. *Global Health Action* **13**(suppl. 1), 1694744.
- Vlček V (2018) Ensuring supplies of medicines during pandemics in terms of public procurement. *Central European Journal of Public Health* **26**, 71–74.
- WHO EURO (2016) *Challenges and Opportunities in Improving Access to Medicines Through Efficient Public Procurement in the WHO European Region*. Copenhagen: WHO.
- Wickware C (2020) RPS Warns of 'huge extra cost' to NHS after bipolar drug withdrawn. *Pharmaceutical Journal*. doi: 10.1211/PJ.2020.20208308
- Wouters OJ, Kanavos PG and McKee M (2017) Comparing generic drug markets in Europe and the United States: prices, volumes, and spending. *The Milbank Quarterly* **95**, 554–601.
- Wouters OJ, McKee M and Luyten J (2020) Estimated research and development investment needed to bring a new medicine to market, 2009–2018. *JAMA* **323**, 844–853.
- Zozaya González N, Alcalá Revilla B, Arrazola Martínez P, Chávarri Bravo JR, Cuesta Esteve I, García Rojas A, Martínón-Torres F, Redondo Margüello E, Rivero Cuadrado A, Tamames Gómez S, Villaseca Carmena J and Hidalgo-Vega A (2020) Pathway towards an ideal and sustainable framework agreement for the public procurement of vaccines in Spain: a multi-criteria decision analysis. *Human Vaccines & Immunotherapeutics* **16**, 2873–2884.