Strategies to facilitate sharing of technology and knowledge through WHO COVID-19 Technology Access Pool
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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The COVID-19 Technology Access Pool (C-TAP), originally proposed by Costa Rica, is a multi-partner initiative established in May 2020 to accelerate the development, manufacture and global distribution of products to diagnose, prevent and treat COVID-19. Sharing of information, knowledge, data and other resources greatly accelerates product development and avoids duplication of efforts. The C-TAP platform facilitates such sharing for the development of products for public health.

At the time of writing, two technology holders, public institutions in Spain and the USA, had entered into licensing agreements with the C-TAP for inventions and candidate products, including vaccines. The C-TAP could be expanded if other technology holders made similar contributions. To promote further engagement of technology holders with the C-TAP, the WHO secretariat administered a questionnaire for Member States to identify legislation, regulations, guidelines and procedures that could be amended or introduced to encourage sharing of technology. Thirty-eight Member States submitted responses to the C-TAP questionnaire. The purpose of this report is to summarize the responses made to the C-TAP questionnaire, in order to highlight the legislation, regulations, guidelines and procedures that Member States could amend or introduce to encourage further engagement of technology holders. This report also provides an analysis based on a review of publicly available information on possible measures that may be implemented to encourage the participation of technology holders in the C-TAP. The discussion contained in this document is intended to inform all actors involved in the process of introducing or amending legislations, regulations, guidelines, and procedures to encourage C-TAP participation.

Part 1 of this document summarizes the responses to the C-TAP questionnaire, while part 2 provides an analysis of measures that could be used to promote participation of technology holders in the C-TAP initiative. The analysis in Part 2 is based on a review of publicly available resources with proposals for addressing unmet global health needs, including incentivizing technology transfer in general and policy options proposed during the COVID-19 pandemic specifically to encourage participation in C-TAP. Based on a review of responses to the C-TAP questionnaire and the accompanying review of publicly available resources, this report highlights some policy options that Member States may implement to encourage further C-TAP participation.
Part 1 – Responses to the questionnaire

Member States reported a wide range of measures implemented to address the COVID-19 pandemic. Most stated that they had simplified administrative procedures, reduced import duties, expedited customs requirements and waived administrative fees, and most had simplified or streamlined their requirements, procedures and timelines for authorizing COVID-19 health products. Furthermore, most respondents had waived or did not usually require clinical studies in the local population.

Several Member States indicated that they were considering additional measures to encourage licensing of intellectual property and technology transfer, including through the C-TAP initiative. Some noted that government procurement, including advance purchase commitments, could encourage technology holders to license their intellectual property through the C-TAP. Over half indicated their willingness to consider financial or innovation incentives, including cash payments, in exchange for licensing to the C-TAP. Technology buy-outs and government procurement are policy options that may warrant additional discussion as potential measures to encourage participation in C-TAP.

Some Member States considered that some of the measures implemented could be improved. Many have supported development of COVID-19 technologies, and some indicated that funding agreements could promote participation in C-TAP. Several Member States had received feedback from technology owners on incentives that would motivate them to participate voluntarily in the C-TAP. Others indicated that they were open to initiating such consultations with technology owners, including companies, universities and independent researchers. Some respondents commented that their engagement with technology holders could be more systematic and structured.

Part 2 – Further analysis of measures

Although several measures could encourage technology holders to participate in the C-TAP initiative, their effectiveness depends on the technology, the holder, timing and other contextual factors. For instance, some measures may encourage the participation of smaller developers but are inappropriate to entice large pharmaceutical companies. As COVID-19 products often involve complex intellectual property landscapes, governments might have to consider different policies for different technology holders, rather than one or a few measures.
Some of the measures considered by Member States are also among the policies frequently proposed in the literature. One is technology buy-outs, which generally consist of cash payments in exchange for open access to patents, data, knowledge and cell lines. Technology buy-outs have often been proposed to address unmet health needs, and several experts have proposed their use to scale up the manufacture of COVID-19 products. Another measure recommended by several experts is including access and innovation terms in funding agreements, as has been proposed for advance procurement commitments. A measure used by two Member States is licensing of government-owned inventions through the C-TAP initiative. This review suggests that technology buy-outs, including access provisions in funding and procurement agreements and licensing of government-owned inventions should be considered for additional discussion.

Other measures reviewed in part 2 are encouraging public and private technology holders to participate in C-TAP; simplifying customs and administrative procedures; reducing or waiving tariffs and import duties; exemption from administrative fees and other administrative measures; tax credits and exemptions; and offering regulatory incentives when safety and efficacy concerns permit.

Policy options and approaches:

- As diverse technology holders with different institutional characteristics, economic motives and intellectual property regulations may participate in the C-TAP initiative, Member States should consider a broad mix of policy measures to encourage participation by all types of technology holders. The mix should address specific institutional characteristics, economic motives and intellectual property.

- As some measures alone may be insufficient to encourage participation in C-TAP, Member States should consider pooling, whereby Member States can implement the measures they have prioritized or that are more feasible in their national or regional context. A pool of measures from several countries may be more effective in encouraging participation in C-TAP.

- Four measures deserve particular attention, as several Member States indicated that they were open to implementing them and they may therefore be used at regional or global level:
  
  o buying out technologies to share them widely through the C-TAP;
include terms to ensure access and innovation into research and development funding and government procurement agreements, including requiring participation in C-TAP;

licensing government-owned inventions and requesting reciprocity from sublicensees, binding them to commitments to share foreground intellectual property and knowledge; and

engaging with technology holders in a more systematic, structured approach.
Part 1.

Questionnaire on measures to encourage participation in C-TAP
Structure of the questionnaire and criteria for the analysis

To facilitate identification of legislation, regulations, guidelines and procedures that could be amended or introduced to encourage sharing of technology, the WHO Secretariat administered a questionnaire listing measures that could be implemented by Member States to encourage technology holders to participate in C-TAP. The measures listed in the questionnaire are generally related to government procedures, market access, regulatory requirements and subsidies or cash payments. For example, the questionnaire listed measures to reduce bureaucratic requirements, exemption from import duties, lower administrative fees, accelerate agency action, waiving the requirement for local clinical studies, granting exclusive supply agreements for the public sector, subsidizing R&D and making direct cash payments in exchange for licensing to the C-TAP. For each measure, Member States were encouraged to answer whether they were (i) “already implemented in your country or region”; (ii) “your country or region would not be able to implement”; or (iii) “not implemented but would consider”. Member States were also encouraged to provide comments with their answer to each question.

Some incentives for participating in C-TAP have already been implemented or respondents indicated that they were considering their implementation, while others have been implemented but could be improved. With regard to measures that have been largely adopted, their further implementation to encourage technology transfer depends on the policy space available. Linkage with the C-TAP might require retroactive amendments or further renewal of programmes. If the administrative or economic measures are considered necessary, regardless of whether they are linked to a commitment to technology transfer, it might be difficult to amend them to include C-TAP. An advantage of programmes that have not yet been implemented is that Member States can link them to the C-TAP initiative immediately.

The review of the incentives questionnaire is therefore organized into: measures that have already been widely implemented; measures that have not yet been widely implemented but are considered by most Member States as a possible incentive to participation in C-TAP; and
measures that have been adopted by several Member States but are considered to require improvement, such as including contractual provisions or conditionalities to ensure access.

Thirty-eight Member States representing all the World Bank classifications of income level submitted responses. They indicated a wide range of measures to address the COVID-19 pandemic. Most cited simplified administrative procedures, reduced import duties, expedited customs requirements, waiving of administrative fees and streamlined requirements for regulatory approval. Several Member States were considering additional measures, such as advance purchase commitments with contractual terms that require technology transfer and cash payments in exchange for intellectual property licensing. Improvement proposed for measures that have been implemented included provisions for access in funding agreements and engaging with technology holders, including universities and public research institutes, to encourage them to participate in the C-TAP.

Fig. 1. Responses to the questionnaire on potential measures to encourage participation in C-TAP

Descriptive analysis

The questionnaire was developed by WHO C-TAP Secretariat and reviewed by the C-TAP Steering Committee. The questionnaire was approved by WHO MHP ADG and launched through WHO GBS. The system used to launch the questionnaire among all Member States was “Lime Survey”, with the designation of their respective focal points through the Diplomatic Missions in Geneva.
A total of 72 focal points were nominated to respond to the questionnaire, and 38 countries submitted responses, mainly between August 2021 and October 2021, while one Member State answered the questionnaire after October 2021. Of the 38 respondents, 17 (45%) are high-income, 12 (32%) are upper-middle income, 8 (21%) are lower-middle income, and 1 (3%) is low-income. The distribution of respondents by WHO regions and income level is shown in Table 1.

The diversity of the Member States that submitted responses indicates that the questionnaire captured a wide range of views on measures to encourage further participation in the C-TAP initiative. The views captured by the questionnaire are summarized below. Nevertheless, the summary below does not represent the views of all WHO members. It only represents the views captured by the questionnaire.

### Measures that are widely implemented

#### Regulatory measures

The questionnaire proposed five possible regulatory incentives: (i) reduce, streamline or simplify procedures for product approval and other regulatory processes; (ii) support good regulatory practices and promote international harmonization and convergence of requirements in line with international standards, work-sharing and reliance; (iii) implement and publish internationally competitive timelines; (iv) waive mandatory requirements for clinical studies in the local population; and (v) any other measures related to regulatory processes or requirements.

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**Table 1. Numbers of respondents by WHO regions and World Bank income level**

<table>
<thead>
<tr>
<th>WHO Regions</th>
<th>World Bank income level</th>
<th>High</th>
<th>Upper-middle</th>
<th>Lower-middle</th>
<th>Low</th>
<th>Total</th>
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<td>-</td>
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<td>-</td>
<td>4</td>
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<td>1</td>
<td>-</td>
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<td></td>
<td>17</td>
<td>12</td>
<td>8</td>
<td>1</td>
<td>38</td>
</tr>
</tbody>
</table>
Most respondents reported that their country had simplified or streamlined the requirements and procedures for trials of health products and for approval. Several Member States in all WHO regions and income levels reported that they relied on and shared work with other regulatory authorities within the existing regulatory framework and/or in response to the COVID-19 pandemic. One Member State noted that participation in international regulatory networks had required introduction of rules and common requirements even before the pandemic, which facilitated regulatory measures through sharing of standards, practices and product information. Several Member States had regulatory pathways for emergency use authorization of medical countermeasures to COVID-19. Others used existing provisions for provisional or conditional authorization for the same purpose. One high-income respondent reported an exceptional framework to allow importation of COVID-19 drugs and medical devices authorized in foreign jurisdictions, even if those products did not fully meet its regulatory standards but were manufactured according to comparable requirements, in order to address national shortages during the COVID-19 pandemic.

Most respondents had implemented measures to reduce the time for clinical trial review and product authorization. Some Member States noted that the speed of authorization depends on the diligence of the applicant in submitting data and replying to questions from regulatory authorities. Several Member States had adopted a “rolling submission” mechanism that allows submission and assessment of packages of information as they become available. Two Member States cited a 15-day target for product review and authorization when a product had been reviewed by other reference agencies.

Several respondents had suspended or reduced regulatory fees for COVID-19 products, including for scientific or pre-submission advice and for clinical trial and product applications. One high-income country noted that fees could be reduced under existing legislation “if the supply of a therapeutic good is in the interest of public health and it would not be commercially viable for the sponsor of that good if the full amount of the fee were paid”. Another high-income country had adopted interim orders for the importation and sale of medical devices, clinical trial applications and new drug submissions, for which administrative fees were waived. Fee waivers or exemptions were commonly cited by respondents.

Most Member States indicated that they did not usually require local clinical trials. Several stated that their national legislation did not require such studies. One Member State cited an executive order that allows issuance of an emergency use authorization for a vaccine without a requirement for local clinical trials. Several respondents noted measures to prioritize, facilitate and fast-track clinical trials for COVID-19 products.
Several Member States reported additional measures that they had or would consider taking to facilitate regulatory approval of COVID-19 medical countermeasures, building on existing consultative practices. Many sought to promote transparency and engagement with the private sector and other sponsors, and several Member States had established or enhanced institutional mechanisms to facilitate consultations with applicants during product development. For example, one upper-middle-income country described scheduling of pre-submission meetings to allow sponsors to present their product development plans and to clarify regulatory requirements. One respondent in a low-income country indicated that they would consider a consultation to determine local “challenges” and “encourage the private sector”. A lower-middle-income country had published patents for several COVID-19 therapeutics to promote transparency and ensure “access to technical information”.

**Simplification of administrative procedures**

Member States were asked whether they had or were considering simplifying administrative procedures or requirements, such as those for importation and regulatory approval, to reduce the time and cost of submitting and processing applications. Most respondents (36, 95%) had done so, mainly for importation and regulatory approval of health products. Some initiatives also addressed accelerating government procurement procedures, prioritizing the examination of certain patent applications, relaxing product labelling requirements and automating administrative processes. One upper-middle-income Member State reported that administrative procedures for importation and regulatory approval of COVID-19 products had been “shortened as much as possible”.

Some countries reported inter-institutional coordination to oversee policies. For instance, a respondent in one low-income country said that “an emergency regulating committee” had been established to oversee the importation and authorization of COVID-19 products. One high-income country provided temporary exemptions to certain procedures, “subject to an assessment on a case-by-case basis”. One upper-middle-income country used a decentralized approach, empowering airports and other customs sites to take certain decisions on the clearance of COVID-19 products.

**Importation duties and tariffs**

Member States were asked whether they had implemented measures to reduce or suspend duties and tariffs on COVID-19 health products or on all products for a defined period
in order to reduce the cost of marketing a product. Most respondents (29, 76%) reported reduction or suspension of duties and tariffs on certain health products, and most of those that had not yet instituted exemptions for import duties or tariffs when the questionnaire was administered reported that they would consider adopting such measures. The products that benefit from exemptions include vaccines, drugs, diagnostic devices, personal protective equipment, machinery and raw materials. In some countries, general exemptions on health products had been enacted by law before the COVID-19 pandemic, but in others they were introduced in response to the COVID-19 pandemic. One upper-middle-income country had abolished the import tax for a list of products considered critical for the COVID-19 response by WHO.

Although these tariff concessions were made unilaterally, some Member States have coordinated their actions. Others have adopted plurilateral declarations, pledging to remove their tariffs on various COVID-19 technologies and also to remove non-tariff barriers and not to impose export restrictions.

In one high-income Member State, exemption from import duty was subject to certain requirements for access. One criterion for exemption was distribution of the goods or making them available free of charge to persons affected by or at risk from COVID-19 or involved in combating the COVID-19 outbreak. Another criterion applied to goods imported by or on behalf of government agencies.

**Customs procedures**

Member States were asked whether they had adopted or would be open to adopting measures to accelerate review of imports, provide for pre-certification or any other related policy to accelerate the market availability of imported goods and reduce costs. Most respondents (32, 84%) had implemented and four more (11%) would consider measures to expedite clearance of health products at customs. Some countries had leveraged existing laws to expedite release of goods for disaster relief and medical uses to accelerate clearance of COVID-19 goods at customs posts. Other countries have enacted special exemptions, for instance relaxing labelling requirements and allowing deferral of payment of duties when hardship is proven.

In order to expedite clearance of imported COVID-19 goods at customs. One high-income country had reviewed its paper-based processes and altered them to minimize human interaction. Several countries reported that their customs measures were consistent with the World Trade Organization Trade Facilitation Agreement.
Administrative or other fees

Member States were asked whether they had or would be open to taking measures to reduce administrative fees, such as for filing documents or requesting permits. Most respondents (22, 58%) had suspended or reduced these administrative fees. Some of the waivers include elimination or reduction of fees related to clinical trials applications and submissions for approval of COVID-19 health products. One high-income Member State indicated that their legislation already allowed for reduced fees “if the supply of a therapeutic good is in the interest of public health and it would not be commercially viable for the sponsor of that good if the full amount of the fee were paid”. Another had adopted interim orders on the importation and sale of medical devices, clinical trial applications and new drug submissions, in which administrative fees were waived.

Measures being considered by several Member States

Financial and innovation incentives

Member States were asked whether they had or would be open to implementing financial incentives to de-link R&D costs from the prices and sales of the products. The question provided an example of prize funds and other mechanisms to promote further development of health products in exchange for sharing intellectual property or knowledge through C-TAP. The questionnaire suggested that such financial incentives could be offered in exchange for sharing intellectual property by a country or group of countries.

Only four (11%) Member States replied that they had implemented any of the financial or innovation incentives described in the questionnaire. Three are high-income countries, and the fourth is a lower-middle-income country. None provided detailed comments or references, however, and the nature of the programmes is unknown.

More than half of the respondents (21, 55%) stated that they would consider implementing the financial or innovation incentives described in the questionnaire. Seven are high-income, nine are upper-middle-income, and six are lower-income countries. Thus, Member States at all income levels are open to considering financial incentives to encourage participation in C-TAP. They represent various WHO regions, with seven in the Region of the Americas, three in the South-East Asian Region, five in the European Region, three in the Eastern Mediterranean Region, and three in the Western Pacific Region. One high-income respondent mentioned that patent buy-outs are among the measures that could be considered but noted that their national research institutes currently lacked funded programmes for that purpose. They also noted that their national research institutes cannot
influence government procurement decisions. One upper-middle-income country suggested that the resources for a buy-out could come from international funders or through bilateral or regional collaboration. Another respondent suggested that a regional funding mechanism be established.

**Taxes on income, sales, wages and property**

Member States were asked whether they had or would be open to providing a tax credit or to exempt some revenues from taxation. The advantage of tax credits and exemptions is that they are tied to activities in the country that provides them. About half of the respondents (17, 45%) reported that they had provided tax credits or exempted some revenues from taxation; 15 (39%) were considering tax credits or exemptions as an incentive. Of the 15 stating that they would consider tax credits or exemptions as an incentive to encourage C-TAP participation, 1 belongs to the African Region, 3 to the Americas, 2 to the South-East Asian Region, 4 to the European Region, 3 to the Eastern Mediterranean Region, and 2 to the Western Pacific Region. One high-income Member State suggested that such tax incentives could be tied to government procurement programmes for the supply of certain technologies.

**Exclusive public market supply**

Member States were asked whether they had or would consider granting an exclusive supply agreement for the public market to a company for a defined, limited period. About one third of the respondents (34%) indicated that they had used this type of measure, and 16 (42%) stated that they would consider it. Of the 16 stating that they would consider granting an exclusive supply agreement for the public market as an incentive to encourage C-TAP participation, 1 pertains to the African Region, 4 to the Americas, 2 to the South-East Asian Region, 5 to the European Region, 2 to the Eastern Mediterranean Region, and 2 to the Western Pacific Region. Two upper-middle income countries reported that vaccines were marketed exclusively for the public sector but that diagnostics were open to the private sector.

**Government procurement**

Although government procurement policies were not included in the questionnaire, several respondents identified them as potential measures to encourage licensing to the C-TAP. One
upper-middle-income country noted that advance purchase commitments could encourage technology holders to openly license their intellectual property and knowledge to the C-TAP. Another high-income Member State reported holding inter-institutional discussions between health and intellectual property authorities about including “equitable access clauses as standard in procurement contracts”. A further high-income Member State noted that inclusion of global access commitments in procurement contracts had already increased the availability of one COVID-19 vaccine.

Measures that have been implemented but could be extended and improved

Funding health R&D

Member States were asked whether their country or region was or would be open to provide funding or incentives for R&D of COVID-19 health technologies. Most respondents (23, 61%) reported that they had funded or otherwise incentivized development of COVID-19 health countermeasures, and several (11, 29%) had not yet funded countermeasures but would consider doing so. Out of the Member States that reported funding or otherwise incentivizing the development of COVID-19 health countermeasures, 1 was from the African Region, 5 from the Americas, 3 from the South-East Asian Region, 8 from the European Region, 3 from the Eastern Mediterranean Region, and 3 from the Western Pacific Region. Of the Member States that had not yet funded countermeasures but would consider doing so, 4 from the Americas, 1 from the South-East Asian Region, 3 from the European Region, 2 were from the Eastern Mediterranean Region, and 1 from the Western Pacific Region. The respondents had funded a wide range of technology R&D, including pre-clinical, clinical and manufacturing of COVID-19 health products, with public funding used for the development of vaccines, therapeutics, diagnostics and other COVID-19 health products. While some Member States leveraged their existing R&D programmes, others had created special funding mechanisms to support COVID-19 technologies. Several respondents described programmes overseen by their ministries of health and of science and national research institutions, while others reported collaboration with other governments in research and in developing funding programmes.

Only one Member State, a high-income country, indicated that terms had already been included in their funding agreements to “ensure research outputs are used to deliver patient benefit whenever possible”. That included a requirement for contractors to seek consent from the funding agency before exploiting research outputs to ensure that they result in
“a return on taxpayer investments”; “step-in rights” to allow the funding agency to access funded research outputs if they are not otherwise exploited “for patient benefit”; and certain “case-by-case” provisions for access in low- and middle-income countries. An upper-middle-income country suggested that laws and regulation might be necessary “to promote open licensing in health technologies”.

Engaging technology owners at national or regional level

Member States were asked whether they had met with companies, associations, universities and other technology holders to explore potential incentives and whether they had received feedback on the incentives that would motivate them to participate voluntarily in the C-TAP initiative.

Ten respondents (26%) had engaged with technology owners at national or regional level and received feedback. Out of these, 5 from the Americas, 3 from the European Region, 1 was from the Eastern Mediterranean Region, and 1 from the Western Pacific Region. One high-income country, for example, had engaged “extensively” with national stakeholders in industry and research institutions to discuss their approach to the management of intellectual property for COVID-19 products and, more specifically, to obtain their views on sharing knowledge with the C-TAP. The respondents had conducted preliminary assessments of existing capability, meetings with technology owners and training sessions with research institutions. One high-income respondent suggested that their engagement with technology owners so far had been “partial”, and another indicated that such initiatives could be “more structured”, implying that the approach could be improved.

Most respondents (21, 55%) stated that they were willing to engage with technology owners, including to motivate them to share knowledge or intellectual property through C-TAP. One upper-middle-income country considered that companies, universities and independent researchers should be approached. Another noted that its ministry of health was the most appropriate agency for engaging with technology owners about licensing to the C-TAP.
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Part 2.

Further analysis of possible measures to encourage participation in C-TAP
Context and factors that influence the effectiveness of each measure

Before further analysing the measures reviewed in this paper, we consider several factors that could influence their effectiveness. First, COVID-19 products – and in particular vaccines – are often subject to complex intellectual property landscapes (1), like other health products. Ensuring the freedom necessary to develop, manufacture and distribute certain COVID-19 technologies may require access to several layers of intellectual property protection covering from foundational discoveries to downstream uses. The intellectual property rights that cover such inventions are often held by separate entities, such as universities, public research institutes and private companies, which usually have different motives for engaging in R&D and often have different legal requirements for intellectual property management. The nature, scope, value and legal strength of their intellectual property rights may also differ significantly.

Another important factor is the timing of use of the technologies during COVID-19. During the pandemic, a wide range of technologies have been used to diagnose, prevent and treat COVID-19. While vaccines based on mRNA platforms first obtained regulatory approval during the pandemic, protein subunit products had been used long before the COVID-19 outbreak. In the case of therapeutics, some repurposed drugs have long been used for other indications, some known compounds received their first authorization during the pandemic, and new antivirals were developed specifically for COVID-19. While most COVID-19 diagnostics have been based on well-known techniques, some approaches were used commercially for the first time during the pandemic, such as COVID-19 diagnostics kits based on CRISPR.

Novel technologies have commercial prospects beyond the pandemic, and some of the new platforms are considered to have several yet-to-be-exploited applications. This may determine the attitude of technology holders towards open sharing through the C-TAP initiative. Similarly, the intellectual property of products that have already been approved or used commercially is generally different from that of older technologies, which have different patent, data and knowledge profiles than those that have obtained regulatory approval or have been used relatively recently.
COVID-19 vaccines and candidates are at all stages of development, from preclinical to approval. COVID-19 therapeutics are in a similar situation, with several shown to be effective and others still being developed. The stage of development reflects the amount of private and public sector funding that has already been invested in the candidate: a product candidate that is still in the preclinical phase has probably required fewer financial resources than one that has already been widely tested in human subjects. Thus, the stage of development also indicates the amount of funding that is still required to complete clinical testing and to pass other regulatory and commercial hurdles. Technological, legal and commercial uncertainty usually decreases during the development of a product, and developers have greater bargaining power with governments and other stakeholders as the commercial prospects of their technology rise. Opportunities for encouraging voluntary access and affordability commitments may also depend on the stage of development and typically dissipate once a product reaches the market and consolidates its position.

All these characteristics influence the effectiveness of measures to encourage participation in C-TAP. For instance, there may be opportunities to include C-TAP conditionalities in funding and advance procurement agreements for candidate products that are still in the early stages of development. To encourage sharing of manufacturing knowledge on a product that has already been developed, cash payments may be more effective. Moreover, while the value of, for instance, administrative fee waivers may be insufficient to encourage the participation of large pharmaceutical companies with COVID-19 products that have been proven to be effective and are already widely available, this measure could be attractive for small private sector entities or universities. Reciprocal grant-back provisions will have a greater impact if the licensed technology relates to basic discoveries with many potential improvements. Furthermore, the incentive to encourage sharing of knowledge about a technological platform will probably have to be stronger than that for attracting the holder of a patent with limited scope. Developers who use technology that was first deployed long before the pandemic may be less concerned about losing competitive advantages by engaging in technology transfer and therefore might require less compensation.

The design and effectiveness of measures to encourage participation in C-TAP may therefore depend on the technologies, their holders and the broader context. As many COVID-19 products involve complex intellectual property issues, governments might consider a mix of policies targeting various technologies rather than just one measure. Some measures could be prioritized, depending on the availability of resources and political will, and, as some of the measures described here are sensitive to timing, they should be prioritized according to the context. The ideal approach, however, is to adopt a group of measures to address several possible situations.
Some of the measures described in the literature may be insufficient alone to encourage participation in C-TAP. Moreover, it may be legally, politically or economically difficult in some countries to adopt some of the measures. Therefore, Member States could offer a package of measures coordinated internationally. For instance, some countries with high tariff schedules could waive or reduce them as an incentive to encourage C-TAP licensing, while those with low tariffs could offer other measures.

Member States could encourage competition through non-voluntary measures, such as allowing exploitation of technology without the consent of the intellectual property holder (2). Such measures include compulsory licensing, which may be particularly effective in cases when patents – rather than data or manufacturing knowledge – are the main barrier to competition. Compulsory licenses have been discussed extensively and are not covered here in detail; however, compulsory licensing pressure has been effective in encouraging technology holders to share their intellectual property rights voluntarily (3). The COVID-19 therapeutics licensed through the Medicines Patent Pool to date, which are small-molecule drugs with dozens of potential manufacturers worldwide, are particularly susceptible to compulsory licensing (4), which probably played a role in the decision to engage with the Medicines Patent Pool.

Inclusion of terms requiring C-TAP licensing in R&D funding agreements

In response to the COVID-19 pandemic, governments worldwide have invested billions of dollars in R&D that has led to many of the technologies that have been used (5, 6). Public investment has de-risked and directed R&D during the pandemic (7), which was built on decades of scientific research supported with public funds (8). Given the substantial public resources allocated to R&D of COVID-19 countermeasures, funding agreements provide an opportunity to secure contractual terms that mandate technology transfer through the C-TAP (9). Member States can condition provision of public funding on sharing patents, knowledge, data, cell lines and other rights with the C-TAP (10). During the pandemic, several Member States have made public statements or political commitments consistent with such types of contractual terms in COVID-19 funding agreements (e.g., 11).¹

¹ Which calls on beneficiaries of European Union funding, in order to maximize the accessibility of research results in the fight against COVID-19, to “[w]here possible, grant for a limited time, non-exclusive royalty free licences on the intellectual property resulting from EU-funded research. These non-exclusive royalty free licences shall be given in exchange for the licensees’ commitment to rapidly and broadly distribute the resulting products and services under fair and reasonable conditions to prevent, diagnose, treat and contain COVID-19.”
For a funder to have sufficient bargaining power to include C-TAP conditionalities depends on timing, the size of the award, uncertainty about the technology, existing agreements and the broader context. Typically, an agreement made early in the development cycle would give funders more leverage than a contract drawn up near or after product approval (11). A large contract usually provides more leverage than a smaller one. Similarly, an agreement to fund a relatively uncertain invention will probably provide more leverage than a contract for developing a promising technology.

The bargaining power of a government or funder to include contractual terms requiring participation in the C-TAP initiative also depends on the broader context and the willingness of other funders. For instance, a late-stage funder who wishes to include provisions on access may be constrained by existing funding agreements and in-licenses that predefine the space of that technology. Therefore, governments should require such contractual terms early in the R&D cycle, especially when significant public funds are being channelled to relatively uncertain technologies. Although inclusion of terms for access at the conception of a project is critical, this type of conditionality should also be adopted at all other stages of the development cycle.

Many of the opportunities for including C-TAP conditionalities and other access terms in early-stage funding agreements were available at the beginning of the COVID-19 pandemic; however, some opportunities remain. C-TAP conditionalities can be included in funding agreements for the development of boosters, multivalent vaccines, novel antiviral treatments and other prospective COVID-19 countermeasures. An example of this type of opportunity is a consortium formed to discover antivirals for COVID-19, funded by the US National Institutes of Health. The consortium “will maximize the use of an open science model that prioritizes global, equitable, and affordable access” (13). C-TAP conditionalities may also be included in funding agreements for coordinated clinical trials for comparing the efficacy of COVID-19 health countermeasures. Similarly, conditionalities can be included in new funding initiatives for pandemic prevention, preparedness and response (14).

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2 Intervention of Tenu Avafia of UNITAID during the C-TAP 2nd Anniversary Webinar convened by the WHO on 16 June 2022. “By the time we get involved in negotiations, there may already be – and very often are – multiple agreements in place. There may be licenses, there may be contracts already in place before we engage. Also, the originator or the developer may have in-licensed technologies with certain requirements and constraints. And so, we find ourselves having to operate within a predefined space.”

3 Intervention of Michelle Childs of DNDi during the C-TAP 2nd Anniversary Webinar convened by the WHO on 16 June 2022. “Commitments to access need to start at the conception phase of R&D, and they need to be put into every stage of the R&D process – from early-stage to late-stage clinical development – and not just thought about when the product has been developed.”
Member States could use international coordination to include provisions on access in funding agreements. Governments that are willing to require such commitments might be unable to introduce such conditionalities if they are competing with funders with more resources and less inclination to introduce such terms (15). As a result, these governments may not pursue access conditionalities in negotiations with prospective developers. International alignment among like-minded funders will increase their political leverage and the pool of financial resources that can be used to encourage participation in C-TAP. Better international alignment among funders might be achieved through model agreements.  

Similarly, because funding agreements often have profound implications, governments and other funders should ensure that negotiations include other developers and manufacturers and also affected communities.

### Licensing of government-owned inventions

Licensing of government-owned inventions is another measure that Member States can take to contribute to the C-TAP and incentivize private sector participation. Because of extensive public funding in health R&D, many governments hold rights in certain inventions useful for combatting the COVID-19 pandemic. Governments and public research institutes hold certain rights in upstream inventions, especially for platform technologies, and also some downstream applications and may still be legally allowed to share their rights in the inventions through C-TAP, particularly in the absence of other agreements that preclude open licensing. As the inventions were developed with the support of government resources, publicly funded research institutions sometimes perceive open licensing as part of their stated mission of promoting the commercialization of new health products or services.

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4 Intervention of Michelle Childs of DNDi during the C-TAP 2nd Anniversary Webinar convened by the WHO on 16 June 2022. “I think it is important that perhaps we also explore whether we could look at model agreements, which could come from a shared vision, and where we could reflect perhaps the best language that could be developed between funders.”

5 Intervention of Michelle Childs of DNDi during the C-TAP 2nd Anniversary Webinar convened by the WHO on 16 June 2022. “It is important to have an inclusive process for the development of funders’ policies and principles. Many negotiations only have two people at the table: the funder and the rights holder; but many other people are interested in the results of that negotiation. So, it is critical that funders develop their approach with other potential developers, manufacturers, and communities that will be affected.”

6 Intervention of Ana Castro of the Spanish National Research Council during the C-TAP 2nd Anniversary Webinar convened by the WHO on 16 June 2022. “At CSIC, we share C-TAP’s objectives about promoting an equitable access of COVID-19 health technologies. […] From our technology transfer office’s perspective, and as technology holders, our aim is that CSIC technology reaches the society as new products or services. So, we are pretty much aligned with C-TAP’s aim in the sense of bringing technology to the society.”
Two Member States have now entered into licensing agreements with the C-TAP to share inventions owned by their public research organizations, including early-stage COVID-19 vaccine candidates. This demonstrates the potential of the C-TAP for promoting open sharing of COVID-19 technologies, which could be extended, if other public research institutions made similar contributions (Fig. 2).

Fig. 2. Flow of reciprocal C-TAP contributions through grant-back commitments

Even for upstream technologies, licensing of government-owned inventions has a strong symbolic value (16). Licensing of government-owned inventions can also be an incentive for reciprocal private sector participation, whereby prospective sublicensees can be required contractually to share their improvements to government-owned inventions – including rights in patents, knowledge, data and cell lines – with the C-TAP. The C-TAP could then offer sublicenses for those improvements to third parties. Thus, any entity that takes a C-TAP sublicense would also be required to contribute their foreground technology to the initiative. This type of open-source licensing approach has long been proposed to address global health needs (17, 18). While grant-back provisions are not necessarily drafted for open source, they are common in license agreements between private sector entities. Similarly, the Medicines Patent Pool has adopted certain grant-back obligations that favour the original licensor (19).

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7 “[…] Universities can help with this goal by patenting foundational technologies and then freely licensing them under the condition that licensees use the same open license terms with related innovations.”
At the beginning of the COVID-19 pandemic, Medtronic made a voluntary pledge for open licensing of designs and software codes for their ventilators, requiring that any modification be available under identical terms (20).

Governments and public research institutes could set the effective date of their C-TAP licenses to the start of the COVID-19 pandemic. This approach, which was adopted by the Open COVID-19 Pledge, would ensure that any past activity that might involve patent infringement be licensed retroactively (21). In such cases, a technology holder at risk of patent litigation for activity at the beginning of the pandemic has the opportunity to take a C-TAP sublicense to retroactively legitimize those potentially infringing uses and would have an incentive to accept grant-back or cross-licensing terms. For similar reasons, reciprocal licensing is particularly important in fields with intense patenting activity and litigation. In some such fields, such as CRISPR, governments and academic institutions are holders or funders of many of the most important patents.

Broad grant-back commitments, including rights in foreground patents, knowledge and data, would be balanced by the remaining contractual obligations, such as the financial terms and geographical scope, that are mostly favourable to C-TAP sublicensees. If there is sufficient bargaining power, C-TAP may also be able to require private sector participants to cross-license their background intellectual property. Once public research organizations have licensed their government-owned inventions to the C-TAP, this incentive can be implemented at a minimal operational cost. It would simply require that a commitment to license back to the C-TAP be included in the sublicense agreements. C-TAP sublicenses could also be coupled with other measures, such as public subsidies, to speed up deployment.

**Engaging public and private technology holders to encourage participation in C-TAP**

To encourage participation in C-TAP, Member States can also engage directly with technology holders affiliated to government agencies, universities and public research institutions. Member States can also directly engage with technology holders in the private sector. To promote this kind of engagement, each Member State could give one government agency the responsibility

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8 A concern raised about grant back provisions in general is that they may shift the incentive to innovate from licensees to licensors; however, evidence suggests that grant-back clauses have no effect on the time to invention if the licensee is unfamiliar with the licensed technology. See reference 22.
of informing public entities and private stakeholders about the C-TAP, and that entity would lead private and public engagement to encourage participation in C-TAP. Member States might also require that their public research organizations appoint a C-TAP focal point in their technology transfer offices to “foster the participation of new players in this game.” Focal points could exchange information with their peers in other national or foreign research institutions about opportunities to encourage participation in C-TAP and jointly disseminate information about the initiative.

The responses provided by Member States to the questionnaire administered by the WHO secretariat indicate that engagement with technology holders is a good means to encourage participation in C-TAP.

Cash payments in exchange for participation in C-TAP

Some technology holders would probably agree to participate in the C-TAP in exchange for cash payments. In a buy-out, governments purchase the rights in patents, knowledge, data, cell lines and other technologies held by private and public sector entities in order to make them widely available. Buy-outs require allocation of resources by governments and other potential funders, which is nevertheless feasible. In the context of COVID-19, governments can pool funds to collectively buy out technologies and share them through the C-TAP. Technology buy-outs have been proposed frequently for health technologies in general (23), including for patents related to infectious diseases (24) and specifically to combat the COVID-19 pandemic (25, 26). Although buy-outs are often proposed for acquiring rights in patents, they can be used to purchase knowledge, data, cell lines and other rights related to COVID-19 technologies (27). Pharmaceutical companies often buy knowledge, cell lines and rights from other private and public sector entities, showing that such transactions are practicable (27).

Buy-outs have several important advantages as an incentive to promote participation in C-TAP. A key feature is that they can maximize the number of generic manufacturers by effectively replacing intellectual property monopolies with a cash prize to the technology

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10 Intervention of Ana Castro of the Spanish National Research Council during the C-TAP 2nd Anniversary Webinar convened by the WHO on 16 June 2022.

11 Intervention of Carlos Correa of the South Centre during the C-TAP 2nd Anniversary Webinar convened by the WHO on 16 June 2022.
holder. A technology buy-out does not, however, require any change to the functioning of the current intellectual property system, at either international or domestic level. As the innovator would receive payment in exchange for sharing the technology, buy-outs do not reduce incentives for future innovation. Buy-outs are particularly well suited for high-value technologies for which the advantage of open access is expected to exceed the cost of the public funds that would have to be allocated (28).

Several approaches and features have been proposed for technology buy-outs. They can be done through government agencies, focused non-profit organizations or nongovernmental entities (29). Funds could be provided by regional or global initiatives, such as the World Bank Financial Intermediary Fund for pandemic prevention, preparedness and response (13). A gap in the proposal made by the World Bank is that technology transfer agreements should ensure equitable access for pandemic countermeasures, including vaccines. Moreover, buy-outs could be voluntary, mandatory or both (30, 31). They could be done exclusively with government funds, include royalties from generic manufacturers or receive contributions from other companies or philanthropies.

Buy-out funds can also be set aside to create a permanent financial instrument, such as a trust, that could be triggered to address future technology transfer (32). Payments could be made immediately after the C-TAP license has been executed or be deferred until further information is available on the value of the technology (33). If payment is deferred, developers would qualify for a previously agreed cash payment after the products have met certain developmental or commercial milestones. The size of the reward can be determined with methods comparable to those used by public agencies to decide which pharmaceuticals are covered by government insurance (30, 31).

Many of the factors used to determine payments in a technology licensing transaction would apply in a buy-out negotiation. They include patent expiration dates, geographical scope of the intellectual property covered, field of use and stage of technological development. Another factor that could be considered in determining the size of the buy-out payment is the contributions of public and non-profit institutions to the research that led to the patented invention or knowledge (24).

The responses of Member States to the questionnaire administered by the WHO secretariat indicate that they consider cash payments to be a good opportunity for encouraging further participation in the C-TAP.
Inclusion of terms requiring C-TAP licensing in advance purchase agreements

Government procurement is important in the pharmaceutical sector in general (2) and was a key policy lever during the COVID-19 pandemic (36). Advance purchase agreements have long been proposed to address unmet global health needs (37) and have been used to fund COVID-19 technologies (38). Advance purchase agreements de-risk R&D by assuring companies that their prospective product, once on the market, will be bought by the public.

Box. 1. Intellectual property payments under the Montreal Protocol

After scientific findings confirmed that use of certain chemical substances was depleting the ozone layer, with grave risks to human, animal and plant health, the international community quickly moved to collective action. The Vienna Convention for the Protection of the Ozone Layer was adopted in 1985 to encourage research, information-sharing and cooperation. Next, in 1987, the Montreal Protocol was adopted for effective implementation of the Vienna Convention. The Protocol includes a list of ozone-depleting substances that must be phased out, with timetables. The Protocol encourages technology transfer among signatories, the main incentive being a financial mechanism known as the Multilateral Fund. Currently, the Multilateral Fund has four implementing agencies: the United Nations Environment Programme, the United Nations Development Programme, the United Nations Industrial Development Organization and the World Bank.

Backed by the Multilateral Fund, the Montreal Protocol has been remarkably successful in promoting technology transfer. Many projects for technology transfer in many industrial sectors have been conducted with the financial support of the Multilateral Fund, including payments to technology holders in exchange for intellectual property licensing or transfers of knowledge. In some cases, the technology resulting from the funded projects has been placed in the public domain. Therefore, some of the projects supported by the Multilateral Fund are examples of cash payments by international agencies to intellectual property holders as an incentive for technology transfer to address global health threats.

Sources: 34, 35
sector. Such agreements can also direct R&D by creating market demand (39). In the context of COVID-19, de-risking through advance purchase agreements has had a significant effect due to the size of the guaranteed payments and their pairing with other forms of government support, such as public subsidies (36).

Several Member States have publicly committed to using procurement to promote COVID-19 vaccines as a global public good (e.g., 40). Moreover, in responses to the questionnaire, several Member States highlighted government procurement as a strategy to encourage licensing to the C-TAP. One means of implementing such proposals is adoption of contractual terms that require companies to share patents, knowledge, data and other rights with C-TAP, through either advance market commitments or government procurement in general. Governments may also retain rights in funded intellectual property and license them to the C-TAP.

Bargaining power is necessary to leverage government procurement in order to encourage participation in C-TAP. This depends on factors such as the cash value of the advance purchase agreement and the stage of development of the procured products. The later governments commit to buying a prospective product, the less margin they have to negotiate favourable access terms (41). Governments will probably have more margin to leverage procurement as a C-TAP incentive for products that are still in the early stages of development, and some uncertainty remains about their efficacy. At the onset of the COVID-19 pandemic, the possibility of developing effective medical countermeasures was highly uncertain. Now, with several effective vaccines and therapeutics on the market, the opportunities for including conditionalities for access have decreased. Similarly, a procurement agreement of relatively small value is unlikely to incite a large company to share a promising technology with the C-TAP. Moreover, once an agreement has been reached, private sector entities are unlikely to accept amendments that require them to participate in the C-TAP, unless they are tied to a cash payment or another type of compensation.

International collaboration can help address these challenges. While individual governments may not have sufficient leverage to include conditionalities in procurement agreements, this may be possible with international alignment. International coordination would increase the political leverage for including C-TAP and other access provisions into national procurement

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12 In the negotiations with the pharmaceutical industry under the present Agreement, the Commission will promote a Covid-19 vaccine as a global public good. This promotion will include access for low- and middle-income countries to these vaccines in sufficient quantity and at low prices. The Commission will seek to promote related questions with the pharmaceutical industry regarding intellectual property sharing, especially when such IP has been developed with public support, in order to [meet] these objectives. Any vaccines available for purchase under the APAs concluded but not needed and purchased by Participating Member States can be made available to the global solidarity effort."
agreements but would also increase the size of the purchase commitment that governments will offer in exchange for accepting such conditions.

Simplifying customs and administrative procedures

During the COVID-19 pandemic, many governments have reduced formalities in order to accelerate custom procedures (42). Many such measures have been compiled by the World Trade Organization secretariat (43). They have generally been introduced to facilitate trade during the COVID-19 pandemic and to accelerate customs clearance of health countermeasures. The initiatives include measures to simplify importation of critical supplies, for instance by accepting e-mails of certain documents and suspending paper copy requirements (44), relaxing the requirement to show proof of empowerment to clear shipments (45) and waiving late fees for delayed filing (46). Some governments have prioritized the clearance of imports of critical supplies (47) and extended the working hours of border agencies (48).

To the extent that further measures of this kind can still be adopted, they could be incentives for participation in C-TAP. While the individual operational and financial benefits of these programmes to the private sector might be below the levels necessary to encourage participation in C-TAP, Member States could offer such measures jointly as part of a package of incentives. They could, for example, quantify their work in facilitating trade and offer implementation of those measures jointly to other countries in exchange for C-TAP support. Trade facilitation and participation in C-TAP could both be part of a larger schedule of concessions that include policies in other fields.13 Member States could also offer their own measures as a contribution to a larger pool of incentives jointly adopted with like-minded countries.

Simplification of customs and administrative procedures for COVID-19 products is desirable regardless of participation in C-TAP. The fact that several governments are or have already implemented policies to do so indicates that the importance of these measures is broadly recognized, and they may have a limited impact on increasing participation in C-TAP.

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13 One precedent to this approach is the proposal for a World Trade Organization agreement on the supply of global public goods, made by Knowledge Ecology International (49).
Reducing or waiving tariffs and import duties

Some jurisdictions provide for the possibility of granting import duty relief in disasters or emergencies (e.g., 50). There are similar exemptions from value added taxes on the final importation of certain goods (e.g., 51). For example, during the pandemic, some European Union Member States triggered this type of provision to temporarily suspend customs duties and value added taxes on protective equipment, testing kits, medical devices and other goods (52, 53). Such measures have generally been used to make it “financially easier to get the medical equipment that doctors, nurses and patients desperately need” (52). Other countries have enacted laws with a similar policy objective.

As many of these measures were adopted at the beginning of the COVID-19 pandemic, some have now expired or will do so soon. Member States could therefore link extensions of such measures to participation in C-TAP. They could also extend the coverage of such exemptions to additional product lines. When such measures have not yet been adopted, Member States could offer them as incentives.

Again, reducing or eliminating tariffs on COVID-19 goods is desirable, regardless of participation in C-TAP (54, 55). Tariffs on vaccines, therapeutics and other health goods are generally seen as regressive (56), and, over the past 20 years, many governments have reduced or eliminated them (57, 58). Therefore, reducing or waiving tariffs might be limited as a C-TAP incentive, as governments are already taking such measures. Member States could offer tariff reductions as part of a larger schedule of concessions in exchange for participation in C-TAP.

Reducing or providing exemption from administrative fees

Regulatory agencies often charge fees for providing scientific advice, evaluating the design of clinical trials, receiving regulatory filings, conducting good manufacturing inspections and other pre- and post-authorization procedures. For some sponsors, the fees can represent a significant proportion of the total cost of developing a product. If the fees are too high, they may discourage involvement with regulatory agencies and thus slow rapid development of products (59). Some regulatory agencies have therefore adopted measures to reduce or eliminate certain fees to incentivize the development of products for, for example, rare diseases (60). To accelerate the development of medical countermeasures, some regulatory agencies have reduced or waived certain administrative fees during the COVID-19 pandemic, including fees for scientific advice on COVID-19 products (61) and on-site inspections of good manufacturing practices (60).
Member States may leverage this type of programme to encourage participation in C-TAP. Regulatory agencies may offer fee reductions or waivers to sponsors in exchange for engaging with C-TAP. These types of programmes could be extended to other business licensing or permits fees. Administrative fee concessions often have a significant impact in the ability of smaller entities and academic institutions to advance product candidates. This type of fee concession may be a particularly attractive incentive if offered for some initial regulatory filings, such as scientific advice.

Granting tax credits and exemptions
Tax incentives have long been used to spur R&D (31). The USA, for example, allows taxpayers to use a favourable approach when deducting expenditures on R&D (62), to claim a tax credit for increasing R&D activities (63) and to claim a tax credit for clinical testing of drugs designed to treat rare diseases (64). Tax incentives have also been proposed to encourage the development of antibiotics (65–67). Tax incentives are more flexible than grants and contracts with regard to the research to be undertaken, and firms are left to direct the funding (68). Tax incentives also have the advantage that they are tied to activities conducted by the benefiting company in the implementing country (69). For a firm with no profit or liability, however, a credit may have value only if it is refundable or can be transferred or carried forward to a future time when the firm is profitable (70). Similarly, tax credits are of no value to non-profit organizations.

During the pandemic, some experts have proposed use of tax credits to fund clinical trials in exchange for reductions in the prices of therapeutics being tested for COVID-19 (71, 72). Member States could also offer tax credits or exempt some revenues in exchange for participation in C-TAP. The landscape of clinical trials of COVID-19 countermeasures is large and geographically diverse (73), so that many countries could potentially offer tax incentives specifically tied to COVID-19 clinical trials.

The questionnaire administered by the WHO secretariat indicated some opportunities for using tax incentives to encourage participation in C-TAP.

Adopting regulatory measures
Regulatory agencies play a critical role in ensuring the safety and efficacy of health products, and they can implement measures to streamline, reduce or simplify some requirements and procedures (68). Regulatory agencies could harmonize their requirements according
to international standards and use work-sharing and reliance programmes to accelerate approval. Moreover, they could set internationally competitive timelines for market review and authorization. A mandatory requirement for clinical trial studies in a local population could be waived if there is no concern about efficacy or safety, at least for conditional approval.

Several such initiatives are under way. Most countries have a variety of regulatory measures to expedite the authorization of medical products to diagnose, prevent or treat COVID-19, as reflected in reports to the International Coalition of Medicine Regulatory Authorities (74). For instance, “an increase in the adoption, implementation and use of registration pathways involving reliance and mutual recognition for COVID-19 products” has been recognized, and some regulatory agencies have introduced flexibility to allow importation or use of unregistered alternatives of products that are or could be in short supply. Others have introduced flexibility to promote early engagement of manufacturers with authorities, such as organizing pre-submission meetings and allowing rolling submissions. Increased communication has been observed between regulatory agencies and stakeholders to discuss technical information related to quality, safety and efficacy.
Conclusions and available policy options:

- As diverse technology holders with different institutional characteristics, economic motives and intellectual property issues may participate in the C-TAP initiative, Member States should consider a broad mix of policy measures to encourage participation in C-TAP by all types of technology holders. The mix should address the institutional characteristics, economic motives and intellectual property profiles of all technology holders.

- As some measures might be insufficient alone to encourage participation in C-TAP, Member States should consider a pooling approach in which they can use the measures they have prioritized or which are more feasible in their context and offer them jointly with measures adopted by other countries. A pool of measures from several countries might be more effective in encouraging participation in C-TAP.

- Four of the measures could be implemented at regional or global level, as several Member States indicated that they were considering them:
  
  - buy out technologies to share them through C-TAP;
  
  - include terms to ensure access and innovation into research and development funding and government procurement agreements, including requiring participation in C-TAP;
  
  - license government-owned inventions, and request reciprocity from sublicensees, binding them to a commitment to share foreground intellectual property and knowledge; and
  
  - engage with technology holders in a more systematic, structured approach.
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