

National Institute for Health and Care Excellence

Health technologies evaluation programme

GID-HTE10006: Virtual Ward Platform Technologies for acute respiratory infections

Consultation comments table

There were 41 consultation comments from 9 consultees:

- 12 comments from 2 healthcare professionals (HCP)
- 15 comments from 4 company representatives
- 3 comments from an NHS Confederation representative
- 1 comment from a member of the public
- 10 comments from the AHSN network

Some of the comments have been split. The following themes have been identified:

- Recommendations: comments 1 to 12
- Additional technology: comments 13 to 22
- Clinical evidence: comments 23 to 27
- Implementation: comments 28 to 32
- Clinical Risk Stratification: comments 33 to 38
- Health Inequalities: comments 39 to 40
- General: comment 41

#	Consultee ID	Role	Section	Comments	NICE response
Recommendations					
1	1	HCP	1.2	<p>-Interfaces should be user-friendly. -Monitoring should be real-time. -Data security measures should be in place* -Adequate tech support for healthcare professionals and patients</p> <p>I would expand on "validated accuracy in people with black or brown skin for devices that measure oxygen saturation". All devices measuring all variables need to be validated in all patient groups- devices using algorithms need to have been tested on younger and older patients, with different body compositions, and patients with specific health problems (e.g. tests in COPD patients as well as healthy young people), as well as stressing the important issue of skin colour and oxygen saturations.</p> <p>* whilst this "is a given" it is worth being explicit, as some patient's worry about this aspect</p>	<p>Thank you for your comment.</p> <p>Section 1.3 and 3.4 of the guidance states that virtual ward technology platforms should have a user-centred design. Section 3.4 also states that associated medical devices should meet local testing standards and must be validated for use in a home or place of residence. All technologies should use spot monitoring or continuous monitoring which would report measures in real time with risk-stratified alerts.</p> <p>Companies offer training and technical support for the use of virtual ward technology platforms. Section 3.7 of the guidance discusses training. Additional wording on technical support has been added to this section.</p> <p>NICE recommends that all digital technologies meet the standards within NHS England's DTAC criteria in relation to data protection.</p>
2	1	HCP	1.3	<p>number of alerts when using a virtual ward, and the proportions of true and false alerts</p> <p>Is it worth mentioning the need to measure aspects that relate to health inequality with demographics?</p>	<p>Thank you for your comment.</p> <p>Wording relating to accuracy of alerts as well as health inequality within demographics has been added to section 1.3.</p>
3	8	AHSN Network	1.1	<p>1.1 Good that the tech used must be CE or DTAC approved, important that patients do not buy their own, no mention of people buying their own and this was certainly the case during the pandemic.</p> <p>DTAC DTAC is not a regulatory standard, rather a list of questions that the supplier can answer to show compliance – it contains standards (DCB0129, etc), but is not a standard in and of itself. The supplier is not certificated or qualified following DTAC's completion (NHS DTAC & Compliance</p>	<p>Thank you for your comment.</p> <p>NICE recommends that all technologies meet the standards within NHS England's Digital Technology Assessment Criteria (DTAC) criteria. It is expected that companies would obtain national DTAC approval and that DTAC would be assessed at a local level whilst technologies are being considered for procurement.</p> <p>We have re-phrased this sentence as follows:</p>

				Services 8foldGovernance), whereas CE marking does give certification. There are companies that can provide a certificate (ORCHA is a good example), but it is up to the adopting organisation to review the supplier's answers to the DTAC to determine risks around the criteria as it applies to their organisation.	These technologies can only be used once they have appropriate regulatory approval, including CE mark, and meet the NHS England's Digital Technology Assessment Criteria (DTAC).
4	8	AHSN Network	1.3	<p>1.3 Further evidence</p> <p>The evidence requirements for VWs seem to be beyond what you would expect / need re the evaluation of the technologies, bearing in mind that multiple factors associated with the VWs (not the tech itself) will impact on these (eg: eligibility criteria, staffing mix, clinical governance model, MDT etc). So the Guidance should separate the evaluation needed on VWs from that needed to assess VW technologies. For example, what is critical and directly relevant to the technology (rather than wider VW factors) would include</p> <ul style="list-style-type: none"> - experience and acceptability for patients, carers and staff . <p>This should include assessment product design, impact on MDT working and impact of interoperability</p> <ul style="list-style-type: none"> - take up and adherence including demographics - a measure on alerts including risk stratification. The total number of alerts is not an appropriate measure as may lead to unintended consequences if high is regarded as bad. Instead, the focus should be on the accuracy and appropriateness of the alerts (eg how many false positives/negatives) - an assessment of resource utilisation eg associated with alerts or the patient taking action based on a recording (eg: patient initiated calls to the VW team or other HCPs like their GP) - Collection of other data for an economic model eg cost of the platform, training, implementation, maintenance etc. However, for the other measures (eg: in section 1.3), the rationale for including this in assessment of technologies is unclear because factors like LOS, readmission, infection rates, waiting times etc are likely to be primarily affected by VW features not the tech (eg: VW admission criteria, VW staffing, VW skill mix, VW clinical governance model etc) and it is well understood that these features vary significantly across VWs and across VW pathways. 	<p>Thank you for your comment.</p> <p>The list of outcomes for further evidence generation was based on identified evidence gaps and expert opinion. A number of factors listed in 1.3 were prioritised as they were identified as key cost drivers in the economic modelling, which included technology costs and associated service requirements. These included:</p> <ul style="list-style-type: none"> • length of virtual ward or hospital stay • hospital admission and readmission rates • number of alerts when using a virtual ward • costs and resource use including virtual ward service delivery costs. <p>Total number of alerts is used to quantify total clinician time needed for reviews. Collection of data on number of contacts with other healthcare providers, such as GP visits, home visits and calls to 111 was suggested to capture the range of NHS contacts available to those on a virtual ward.</p> <p>Acceptability of virtual ward use for patients, carers and healthcare professionals are also listed as key outcomes for data collection.</p> <p>Considerations of the services needed to deliver care and the technology are needed to determine the service and economic benefits associated with using a technology enabled virtual ward and the features they offer.</p>

5	8	AHSN Network	General	Would recommend adding environmental sustainability impact for hospital admission/stay vs. VWs as another evidence generation (and potentially cost saving) area.	<p>Thank you for your comment.</p> <p>The list of outcomes for evidence generation were based on those prioritised by the committee. The decision was based on information from the external assessment group (EAG) report on the clinical and economic evidence gaps.</p>
6	8	AHSN Network	General	Though there is focus on patient experience (and rightly so), the evidence does not seem to mention the potential staff experience and/or consider change to their working practices + potential knock-on effects - this is perhaps more relevant for systems that are reassigning staff than outright recruiting, but as much of the success of virtual wards is placed on staff as well as on the technology involved.	<p>Thank you for your comment.</p> <p>Section 3.15 of the guidance mentions evidence surrounding healthcare professional acceptability. It states that there was a high level of acceptability. Section 5.3 of the EAG assessment report summarises evidence on healthcare professional acceptability from 5 studies. The EAG have suggested healthcare professional acceptability as an outcome for further evidence generation as stated in evidence gap overview section (section 3.21) of the guidance document.</p>
7	8	AHSN Network	General	Has all the learning from the different AHSN projects been considered? The Wessex AHSN NIPP project focused on the use of digital interventions to support the care of people with frailty (also of relevance to ARI treatment) work around myCOPD app and online implementation toolkit.	<p>Thank you for your comment.</p> <p>Evidence considered by EAG included studies identified by stakeholders and through a literature search. Only evidence on people with an acute respiratory infection receiving virtual ward care was included and considered.</p>
8	8	AHSN Network	General	Data platforms: the data they collect, how it is shared, DSA? During our pandemic work, we found that many platforms restricted data access and did not collect data in a unified way making evaluation difficult. Companies need to be able to collect, store and share data for research/clinical evaluation purposes. Also worth understanding each supplier's data destruction protocols; how long will they hold patient data for?	<p>Thank you for your comment.</p> <p>NICE recommends that all digital technologies meet the standards listed within NHS England's DTAC criteria (stated in section C2) in relation to data protection.</p> <p>NICE's guidance and associated evidence generation plan suggests what data should be collected by companies or healthcare providers as well as key outcomes to unify the data collection needed for future evaluations of these technologies.</p>

9	8	AHSN Network	General	<p>Managing Risk</p> <p>Good that initial assessment must be done in person (does this mean face-to face rather than remotely), should we be clear, especially when you need to monitor colour of skin, pallor, sweating etc this can be masked if done by video etc. Although healthcare professional not defined: should it be or rather has a set of skills and competence to assess and report? Respond to alerts? There needs to be an escalation process that is overseen by a senior HCP. There also needs to be a clear protocol about supervision by a HCP, which team is responsible, Primary care or secondary care? Who has responsibility for the technology once it is deployed?</p>	<p>Thank you for your comment.</p> <p>The care pathway for assessing and monitoring patients on an acute respiratory infection (ARI) virtual ward is based on NHS England's guidance on ARI virtual wards. This evaluation focuses on the platform technologies and so making decisions on the care pathway and staffing is outside of the scope of this evaluation.</p>
10	8	AHSN Network	General	<p>Patient group: good to note that access and choice important but other considerations need to be considered: heating, access to meals, level of frailty and cognitive impairment, living alone, living with learning disabilities, living with learning difficulties, if a patient declines rapidly they may not be able to summon help or sustain themselves. Safeguarding also important to consider in this context - could some of these themes be made more explicit in the Guidance? The Wessex NIPP project found that simple, jargon-free instructions should be provided across multiple languages.</p>	<p>Thank you for your comment.</p> <p>Text has been added to the guidance document in relation to other patient considerations (section 3.10) listed in this comment.</p>
11	8	AHSN Network	General	<p>Resources; important to note that whilst VW is an alternative to a hospital bed, the resources required to assess, monitor, respond to alerts and safety net need to be factored in for primary care/community services, additional resources that would not have been required if the patient was in hospital.</p>	<p>Thank you for your comment.</p> <p>These resources have been considered in the economic modelling where possible and have been suggested as areas for further evidence generation.</p>
12	8	AHSN Network	General	<p>Further thoughts:</p> <p>There may be value in comparing tech and non tech enabled home care rather than comparing tech enabled VWs and hospital stays</p> <p>This is because the patient acuity can be very different across patients on VW and IP. For step down, for example, a clinical decision is taken that the patient is eligible to be discharged onto a VW (i.e. no longer needs to be in a hospital environment).</p> <p>Comparing tech and non tech enabled provide insight into when adding in tech adds or doesn't add value in terms of</p>	<p>Thank you for your comment.</p> <p>Care at home without the use of a technology enabled virtual ward was an in-scope comparator for this evaluation. This includes the use of non-technology enabled virtual wards. The clinical evidence (section 3.14 of the guidance) included one prospective cohort study comparing a technology enabled virtual ward with a telephone-based virtual ward. The economic evaluation (section 3.17) also compared technology enabled virtual wards with care at home without a technology enabled</p>

				<p>safety, cost effectiveness etc</p> <p>The variation in how VWs are measuring and recording acuity will make any comparative evaluation difficult. For any comparison across VWs and IP, an agreed score of acuity will be needed applied alongside controlling other VW factors so that the evaluation is clearly of the tech vs the VW model of care.</p>	<p>virtual ward and found a potential saving of £115 per person if a technology enabled virtual ward was used.</p>
Additional Technology					
13	2	Company	1.1	<p>Masimo EAG Summary</p> <p>Clinician-facing features: When using the Masimo SafetyNet platform case managers and clinicians will be able to view near real-time patient vital signs (if the patient is wearing a continuous Masimo wireless sensor), view alert notifications for any measurement or symptom that is out of range or crossed a threshold, receive alert notifications on the Clinician Dashboard, via e-mail, or text message, and review patients trend history for all parameters and entered symptoms or questionnaire responses. Clinician-facing features: alarms based on clinically defined set of rules or requirements, patient questionnaires and qualitative questionnaires. Each care program can be designed at installation and branching logic can be applied or deviations from baseline values can be applied to trigger an alert or alarm. Video conferencing with chat, white board, screen sharing is also available between patient and Clinician.</p> <p>Patient-facing features: The Masimo SafetyNet App is the hub for all devices, sensors, and patient engagement. CarePrograms, or digital care pathways, are created by clinicians and pushed to the app, prompting patients to enter symptoms and review educational material. CarePrograms define the care pathway for specific medical conditions such as CHF, COPD, COVID-19, etc. Measurements from sensors and devices are automatically captured by the CareProgram and sent to the Masimo SafetyNet cloud once every minute. The CareProgram can also prompt the patient to engage with questions about their symptoms, to take specified actions, ore review education material. Video conferencing with chat, white board, screen</p>	<p>Thank you for your comment.</p> <p>This technology has been added to section 2.1 of the guidance.</p>

				<p>sharing is also available between patient and Clinician</p> <p>Additional & advanced features: Video conferencing with chat, white board, screen sharing is also available between patient and Clinician. Care program design tailored to each virtual clinician site.</p> <p>Devices supported: peripheral medical devices (e.g. pulse oximeter) and specified medical devices with Bluetooth automation can be used. Continuous monitoring devices also supported.</p> <p>Current NHS use: West Hertfordshire hospital, Cambridge University hospital , James Cook Hospital</p>	
14	2	Company	1.2	<p>The Masimo SafetyNet telehealth platform, with the unique use of Masimo devices offering clinical grade wearable continuous measurement sensors, extends traditional remote patient management to meet the monitoring needs of Hospital at Home, Hospital to Home, and Chronic Care. Continuous measurement sensors such as the Radius PPG pulse oximeter and Radius T thermometer can be worn by patients in the home and paired to the Masimo SafetyNet mobile app to collect measurements and patient reported outcomes. These data points are automatically sent once per minute to the secure Masimo SafetyNet cloud for near real-time access by clinicians, enabling surveillance style monitoring of patients in the home. Similarly, patients needing long term monitoring can use Masimo and third-party spot-check devices such as fingertip pulse oximeters, blood pressure monitors, and weight scales to automatically transmit data to clinicians and case managers. Importantly, Masimo SafetyNet was designed to support various workflows and reduce clinician burden. The clinician dashboard features multiple views for live and historical trend data, alerts of any measurements or symptoms not within range, and EMR integration for automated documentation.</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 13.</p>
15	2	Company	1.2	<p>Masimo SafetyNet® with Radius-PPG, Radius-T and Masimo Spot check devices are CE marked and classified as MDD Class IIb. Masimo SafetyNet is DTAC compliant.</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 13.</p>
16	2	Company	1.2		<p>Thank you for your comment.</p>

				<p>Masimo SET® Pulse Oximetry Has No Difference in Accuracy or Bias Between Black People and White People. Following link to study https://www.masimo.com/siteassets/us/documents/pdf/clinical-evidence/set/barker-wilson-2022-set.pdf</p> <p>The authors analyzed the data to determine the bias (the mean difference in paired SpO2 and SaO2 samples), precision (standard deviation of the difference), and accuracy (root mean squared error, ARMS*) for both groups. They found a negative bias of 0.20% for black subjects, compared to a negative bias of 0.05% for white subjects, a difference of 0.15% (p < 0.001), which is not clinically significant and is numerically indistinguishable because the SpO2 display resolution is 1% on commercially available pulse oximeters (both from Masimo and other manufacturers).</p> <p>In addition Masimo SET® Measure-through Motion and Low Perfusion™ pulse oximetry, introduced in 1995, has been shown in over 100 independent and objective studies to outperform other pulse oximetry technologies. Masimo SET® has also been shown to help clinicians reduce severe retinopathy of prematurity in neonates, improve CCHD screening in newborns, and, when used for continuous monitoring with Masimo Patient SafetyNet™ in post-surgical wards, reduce rapid response team activations, ICU transfers, and costs. Masimo SET® is estimated to be used on more than 200 million patients in leading hospitals and other healthcare settings around the world.</p>	<p>Please see NICE's response to comment 13.</p>
17	2	Company	1.2	<p>When using the Masimo SafetyNet platform case managers and clinicians will be able to view near real-time patient vital signs (if the patient is wearing a continuous Masimo wireless sensor), view alert notifications for any measurement or symptom that is out of range or crossed a threshold, receive alert notifications on the Clinician Dashboard, via e-mail, or text message, and review patients trend history for all parameters and entered symptoms or questionnaire responses. Clinician-facing features: alarms based on clinically defined set of rules or requirements, patient questionnaires and qualitative questionnaires. Each care program can be designed at installation and branching</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 13.</p>

				logic can be applied or deviations from baseline values can be applied to trigger an alert or alarm.	
18	2	Company	2.1	Masimo Europe Limited , was not identified in this scope, We have several examples of NHS hospitals using Masimo SafetyNet . West Hertfordshire WHTH and CLCH established the UK's first virtual hospital during the Covid-19 pandemic, providing a safe alternative to inpatient care for over 5,000 patients and saving countless bed days. Since then, the programme has evolved to offer heart failure, chronic obstructive pulmonary disease, and acute respiratory infection virtual wards. https://www.westhertshospitals.nhs.uk/mgs/West-Herts-COPD-VW-evaluation.pdf	Thank you for your comment. Please see NICE's response to comment 13 on the addition of this technology and the response to comment 25 on the evidence submitted.
19	2	Company	2.1	The Masimo SafetyNet telehealth platform, with the unique use of Masimo clinical grade wearable continuous measurement sensors, extends traditional remote patient management to meet the monitoring needs of Hospital at Home, Hospital to Home, and Chronic Care. Continuous measurement sensors such as the Radius PPG pulse oximeter and Radius T thermometer can be worn by patients in the home and paired to the Masimo SafetyNet mobile app to collect measurements and patient reported outcomes. These data points are automatically sent once per minute to the secure Masimo SafetyNet cloud for near real-time access by clinicians, enabling surveillance style monitoring of patients in the home. Similarly, patients needing long term monitoring can use Masimo and third-party spot-check devices such as fingertip pulse oximeters, blood pressure monitors, and weight scales to automatically transmit data to clinicians and case managers. Importantly, Masimo SafetyNet was designed to support various workflows and reduce clinician burden. The clinician dashboard features multiple views for live and historical trend data, alerts of any measurements or symptoms not within range, and EMR integration for automated documentation. The system is supported by Masimo teams for implementation, training, technical and customer support.	Thank you for your comment. Please see NICE's response to comment 13.

20	2	Company	2.1	<p>In addition to West Hertfordshire hospital Cambridge university hospital utilizes Masimo SafetyNet for their virtual ward . https://www.businesswire.com/news/home/20230507005042/en/Cambridge-University-Hospitals-Expands-Virtual-Care-Program-with-Masimo-W1%E2%84%A2</p> <p>https://www.cuh.nhs.uk/our-services/virtual-wards/</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 13.</p>
21	2	Company	2.1	<p>appendix A summary of Masimo Masimo, a large global company focussed on innovative non-invasive monitoring technologies, is committed to improving patient care and reduce cost of care globally with over 6,500 talented employees worldwide.</p> <p>Operating within more than 150 countries, monitoring more than 200 million patients in healthcare settings around the world annually. 9 of the top 10 hospitals in Europe and United States use Masimo technology.</p> <p>Masimo revolutionised pulse oximetry technology with Masimo SET®, which is renowned for its accuracy and reliability, even in challenging conditions of motion and low perfusion.</p> <p>Masimo's Telehealth solution, Masimo SafetyNet was created to improve the clinical efficacy of patient monitoring within a virtual ward solution. Supporting you in avoiding hospital admission, ensuring secure and early patient discharge or ultimately to reduce the cost of care for the community and improve patient outcomes and satisfaction.</p> <p>Masimo SafetyNet is used in more than 230 hospitals</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 13.</p>

				<p>globally and more than 30,000 patients have already been onboarded. Masimo SafetyNet is already used across the NHS, we have the DTAC and our innovative products have been in use across the NHS for over 15 years.</p> <p>Masimo SafetyNet is a secure, scalable, cloud-based patient remote management platform allowing clinicians and hospitals to continuously manage and monitor patient's vital signs, PROMs, PREMs remotely and be alerted in case of patient deterioration.</p>	
22	2	Company	2.2	Masimo SafetyNet® with Radius-PPG, Radius-T and Masimo Spot check devices are CE marked and classified as MDD Class IIb. Masimo SafetyNet is DTAC compliant.	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 13.</p>
Clinical Evidence					
23	1	HCP	3.8	<p>https://pubmed.ncbi.nlm.nih.gov/30948606/</p> <p>In our qualitative analysis of hospital at home, one of the main themes was home comforts, including sleep quality, food, convenience for friends/ family, and the fact that you saw the same healthcare professionals who had adequate training (continuity of care). Also the avoidance of costs associated with family/ friends having to visit, and challenges of parking/ public transport.</p>	<p>Thank you for your comment.</p> <p>The EAG were asked to respond to this comment and provided the following response:</p> <p>The EAG excluded this study from their assessment at title and abstract (Dismore et al., 2019) due to ineligible study design (qualitative design). This study also did not report the use of a technology enabled virtual ward.</p> <p>A number of the patient consideration stated in this report were also reported for technology enabled virtual wards and included in section 3.8 to 3.10 of the guidance.</p>
24	1	HCP	3.14	<p>https://thorax.bmj.com/content/73/8/713</p> <p>Our RCT was UK based! Not sure why it was not included.</p>	<p>Thank you for your comment.</p> <p>The EAG were asked to respond to this comment and provided the following response:</p> <p>The EAG excluded this study at full text due to ineligible intervention (Echevarria et al., 2018) due to there being no</p>

					technology enabled virtual ward platform. Hospital at home comprised daily visits from a respiratory specialist nurse, under remote supervision from a respiratory consultant. Patients given an emergency contact number so they could contact the team 24 hours a day, 7 days a week.
25	2	Company	1.3	<p>Please see following links for acute respiratory Patients on a virtual ward using Masimo SafteyNet West hertfordshire AHSN full evaluation report using Masimo SafetyNet COPD and other respiratory disease. https://www.westhertshospitals.nhs.uk/messages/West-Herts-COPD-VW-evaluation.pdf Patel Et al 2022- Covid Virtual ward https://www.liebertpub.com/doi/10.1089/tmj.2021.0510?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed * Reduction in LOHS 36%</p> <p>West Herts Heart Failure Virtual ward https://www.westhertshospitals.nhs.uk/messages/hfvf.pdf * LOHS= 3 days reduction 36%</p>	<p>Thank you for your comment.</p> <p>The EAG were asked to respond to this comment and provided the following response:</p> <p>https://www.westhertshospitals.nhs.uk/messages/West-Herts-COPD-VW-evaluation.pdf – This study was not found by EAG searches.</p> <p>Eligible study in mixed patients with acute chronic obstructive pulmonary disease (COPD) exacerbations. Uncertain relevance of patient group around having ARIs: 52% in virtual ward (VW) group had primary diagnosis of COPD, 30% ‘different respiratory condition’, 18% ‘other’. Tech-enabled COPD VW evaluating step-up and step-down care in the UK.</p> <p>Mixed methods comparative cohort study, comparing 3 cohorts of patients: Historical pre-pandemic, MDT assessed patients not onboarded during VW study period, MDT assessed patients onboarded to VW during study period (Dec 21 to Dec 22). Outcomes available: duration of VW stay, length of stay in secondary care, readmissions to secondary care, contacts for VW patients, experiences and views of service users on VW, experiences and views of staff on implementation, delivery and impacts of VW, cost-benefit analysis Quality and generalisability: before-after comparison to historical controls from a pre-pandemic setting likely to be generalisable; comparison to patients not onboarded may be less reliable if these patients differ systematically from those onboarded during the same period (VW group patients). UK study provides good generalisability. Data from only 46 patients (50 admissions) in the VW group may limit reliability of study and ability to clarify whether differences were due to chance. Statistical significance of differences was not reported. For the cost-benefit analysis, not enough information is provided to ascertain that all costs of a technology-enabled virtual ward are included in the analysis (including the technology itself).</p>

					<p>https://www.liebertpub.com/doi/10.1089/tmj.2021.0510?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed -The EAG included this study (Patel et al., 2023) but deprioritised it due to population, comparator and NHS availability.</p> <p>https://www.westhertshospitals.nhs.uk/messages/hfvf.pdf - Poster abstract of a technology enabled heart failure virtual ward, not found by EAG searches. Study is ineligible due to population (heart failure).</p> <p>Reference to the eligible studies has been added to 3.16 of the guidance document.</p>
26	2	Company	3.19	https://www.westhertshospitals.nhs.uk/messages/West-Herts-COPD-VW-evaluation.pdf	<p>Thank you for your comment.</p> <p>Please see NICE's respond to comment 25 on this study.</p>
27	7	HCP	General	<p>I led an RCT of Hospital at Home for COPD exacerbation selected by DECAF (clinical risk stratification) score, but not included in this review (Thorax 2018;73:713-22). This trial underpins our clinical service, current VW, and has been promoted by the AHSN and the regional Respiratory Network to support establishment and recruitment to VWs (included within the VW protocol).</p> <p>Within the RCT:</p> <ul style="list-style-type: none"> - All patients were triaged for admission - true replacement for conventional hospital care. - Patients with new onset respiratory failure requiring controlled oxygen and/or with complication pneumonia were included (excluded from most H@H models), provided low risk by DECAF (approx 50% of admitted patients have a low risk score). The clinical service based on this trial now includes intermediate risk patients, and after a period of in hospital stabilisation, higher risk patients on an improving trajectory. - Primary outcome: Total health and social care costs over 90 days: costs were £1,016 lower within H@H, primarily driven by a 5-fold reduction in bed days. - No increase in readmissions within H@H, no deaths within the acute period and mortality balanced at 90 days. 	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 24.</p>

				<p>Whilst "tech light", patients were supported with pulse oximetry (not continuous bluetooth monitoring - this was the major driver of false alerts and increased cost in the TELESCOT trial), at least daily visits during the acute period (~5 days) and 24/7 specialist respiratory on call with telephone support.</p> <p>This RCT was identified as an NIHR Signal. We are happy to share the service manual and all assessment documents on request.</p>	
Implementation					
28	1	HCP	3.5	<p>I am aware that there have been issues in some regions with regards to having sufficient staff. A virtual ward can only work if the staffing infra-structure is in place, and I think this is worth stressing.</p> <p>As well as having training in the technologies, staff have to have appropriate clinical experience to deal with the patients group they are looking after- e.g. frail patients, those with COPD, etc. I think that this is important as with the expansion in these services there is a risk that healthcare workers without the requisite skills will be asked to look after complex patients out of the in-hospital setting.</p>	<p>Thank you for your comment.</p> <p>This comment is outside of the scope for this evaluation. NHS England's guidance on ARI virtual wards states that a virtual ward should be led by a named consultant practitioner (including a nurse or allied health professional (AHP) consultant) or suitably trained GP, with access to timely specialist advice and guidance. Virtual ward models may draw on multidisciplinary staff from multiple settings, including appropriately trained registered professionals and staff who may not normally be patient facing.</p>
29	6	NHS confederation	1.1	<p>Virtual Ward expansion into different modalities is welcomed, especially where local ICSs have population health data which shows which pathway will be most beneficial for the population to support step up care and avoid hospital admission.</p> <p>NHS Confed members recently told us that the current focus on availability of technology and admission avoidance is not enough on its own without the use of good available data to understand where prevention opportunities lie. They stressed that designing the care pathway now and for the future needed to be based on fully understanding demand and that this required access to good data that can shape priorities for improving patient outcomes, evidence</p>	<p>Thank you for your comment.</p> <p>NICE acknowledges that virtual ward platforms for acute respiratory infections has a developing clinical evidence base. The recommendations made include those for further evidence generation to help support adoption and future health economic modelling.</p>

				<p>prevention in the population and free up bed capacity and financial efficiencies.</p> <p>Currently the NHS lacks the full knowledge and information about the future health modelling and the risks facing our populations and communities. Without this it is not possible to fully understand risk factors, to appropriately manage those scenarios and needs in the longer-term, or to shape what those needs may look like across a whole integrated health and social care pathway.</p>	
30	6	NHS confederation	1.3	<p>The promise of finding solutions to delivering care in a context where face-to-face interactions are being squeezed means much hope has been pinned on the expansion of virtual wards, with more organisations delivering care through various non-physical modes including telecare, remote monitoring, wearable tech and hands-free tech, among others.</p> <p>A key principle of virtual care is to release capacity and resource from the wider system and reduce pressure where a bottleneck of high demand and long waits converge to create unprecedented pressure at every point in the system. Building understanding and credibility among patients is critical to virtual ward success. Successful pathways are those where patients identified for virtual ward care have been supported through admission by their clinician. However, demand for services and pressure in the system can restrict opportunities for embedding and delivering more virtual care pathways.</p> <p>For example, patients are available and willing to receive care via a virtual ward but where wider social care support was not available. At its best a virtual ward can provide clinical and multidisciplinary support but with more caring elements of human interaction – for example, rest, food and heat – provided at home or in a care setting.</p> <p>Virtual wards alone will not meet demand. The clinicians and leaders we spoke to highlighted the importance of getting the design process right. This includes the methodology for understanding how and why the virtual ward was necessary, as well as access to good data that</p>	<p>Thank you for your comment.</p> <p>The focus of the evaluation is on the virtual ward technology platforms and the features they have to support adoption of virtual wards. The care pathway and staffing described is based on NHS England's guidance on ARI virtual wards.</p>

				<p>can both drive demand and identify wider support needs. These factors – alongside collaboration and patient-centred design – are needed if virtual ward pathways are to be meticulously planned, to support patients and achieve desired outcomes.</p> <p>The continuous juxtaposition between supply of available workforce and demand for care throws relentless pressure on the entire NHS. With NHS workforce vacancies at an all-time high, the reality is that the lack of workforce is not only impacting the traditional elements of face-to-face care and impacting waiting lists but is also limiting the ability to harness virtual wards to the full extent expected by NHS England.</p> <p>Where workforce is working well in virtual wards may be due to the availability of consultant and senior nurse roles, and this is due to where providers have long-established a model of remote or virtual care before the more recent push from the centre. In these instances, staff resources have been sufficient to allow workforce redistribution to service virtual ward models. However, challenges arise where specialties, such as acute respiratory infection, are dictated as this results in a smaller recruitment pool, especially in the context of NHS workload overwork, burnout and low morale at all levels.</p> <p>Specific skill set and career pathways are needed for virtual wards and this remains a significant barrier. In overcoming this a more effective model is needed that has in-built flexibility across specialties or clinical teams who are able to work across pathways and within multidisciplinary teams, with the ability to pivot and call in specialists if patients' needs escalate. Such an approach to virtual wards – supported by NHS England – would need to use a flexible approach to recruiting staff and be less tied in with specialties.</p>	
31	6	NHS confederation	1.3	<p>The assumption made is that delivering a digital model of care means fewer NHS staff as fewer face-to-face touch points are created. However, to deliver the model, clinicians are required to drive the virtual ward forward with enthusiasm, leadership and full accountability. Consultant</p>	<p>Thank you for your comment.</p> <p>Section 1.3 asks that further evidence is generated to capture not only the costs and resource use including virtual ward service delivery costs but also patient and carer experience and</p>

				<p>enthusiasm is crucial as a critical driver to successful implementation of virtual wards. However, many consultants are concerned about absorbing the full risk of managing and discharging patients in this way. In alleviating this concern building staff confidence is vital. Their experiences show that supporting clinicians at all levels with risk stratification, discrepancy, confidence, education and training, helps to shift the mindset of those who are yet to be sold on the value that virtual wards can bring to their speciality and to patients.</p> <p>Overcoming these challenges involves raising clinical and operational awareness of virtual wards through investing in engagement. Working with clinicians and engaging patients in co-design from the start of the pathway design process contributed to success. Harnessing the opportunity for clinical transformation, designing and changing pathways and principles to meet the demands of the NHS and the opportunity to scale innovation, were key drivers of successful virtual wards.</p> <p>Faced with reduced staff and high demand, where leaders and clinicians worked in partnership to employ risk-stratification strategies – including redeploying staff and onboarding tools for virtual ward pathways – significant gains in developing and governing virtual wards were made. Indeed, many of these gains were made during the pandemic when providers worked quickly across boundaries, teams and organisations to share resource, skill and risk to scale virtual services.</p> <p>In implementing new virtual wards, clinicians, leaders and communities must be involved in co-design from the start of the design process. Successful examples of virtual wards have depended on patients identified for virtual ward by fully engaged and enthusiastic senior clinicians supporting the ambitions of the virtual wards programme. Patients and communities should feel empowered to discuss alternative means of receiving care with their clinicians and discuss the possibility of virtual care within a care pathway.</p>	<p>acceptability (including carer burden), healthcare professional experience and acceptability.</p> <p>Section 3.5 of the guidance highlights that healthcare professionals and patients need to be involved in the set up of virtual wards to help support implementation.</p>
32	3	Company	2	<p>The new NHS England guideline for Point of Care diagnostics published 31 August 2023, "Integrating in vitro point of care diagnostics: guidance for urgent community</p>	<p>Thank you for your comment.</p> <p>The consideration of point of care testing is outside of the scope of this assessment. Section 2.3 of the states that</p>

				<p>response and virtual ward services," Mentions that "The main PoCTs virtual ward providers are typically using to aid clinical decision-making are ... including influenza and COVID-19 ..."</p> <p>To avoid re-admissions related to COVID-19 or Influenza infections, especially in winter months, *COVID-19 and influenza assays should be included in this technology section*.</p> <p>To support this suggestion, please refer to our 'rapid molecular POC ID NOW solution performance [1,2] and the above guideline: "PoCT is an area that is constantly evolving; what is available now is not static or fixed. The types of PoCT required differ by type of virtual ward".</p> <p>1. https://www.globalpointofcare.abbott/gb/en/product-details/id-now-covid-19-ww.html 2. https://journals.asm.org/doi/full/10.1128/jcm.00413-23?rfr_dat=cr_pub++0pubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org</p>	<p>appropriate diagnostics should be part of a clinical assessment. NHS England's guidance on ARI virtual wards suggests a potential list of diagnostic tests which could be included, subject to clinical judgement.</p>
Clinical Risk Stratification					
33	1	HCP	1.3	<p>It is crucial that patients are risk assessed at the point that they have their clinical review. In the interests of transparency, I was involved in the development of the DECAF risk score, which was specifically designed for this purpose- to help with the identification and selection of patients for Hospital at Home service. Risk stratification not only allows the inclusion of patients with a low risk of death, but also results in an expansion in the number of patients that are suitable for inclusion. There have now been more than 17 studies, and a meta-analysis of the DECAF score: https://bmjopen.bmj.com/content/10/10/e037923. The use of the DECAF score for inpatients entered into a virtual ward can also then be used in reporting. For example, the number of patients who are entered into the virtual ward is a suboptimal measure as it may result in the inclusion of milder patients, whilst the proportion of low risk DECAF patients entered takes this into account. Lastly, the DECAF has been embedded into several virtual wards in the UK such as: <a #"="" href="https://www.westhertshospitals.nhs.uk/msgs/West-</p> </td> <td> <p>Thank you for your comment.</p> <p>Validity of scoring systems for clinical review and risk assessment of people being considered for a virtual ward is outside the scope of this early value assessment. The clinical care pathway described, including severity scoring tools, are based on NHS England's guidance on ARI virtual wards. The guidance states that clinical judgement should be used and that services may need to develop their own admission and discharge criteria for acute level care in line with their population needs, available workforce and competencies.</p> <p>The EAG confirmed that determining the eligibility of included studies was not limited by the risk stratification score used (e.g., NEWS2 or DECAF).</p> <p>Please see NICE's response to comment 24 on the West Herts COPD evaluation.</p>	

				Herts-COPD-VW-evaluation.pdf In the latter, the DECAF score additionally was used to guide which patients needed respiratory consultant review.	
34	1	HCP	2.3	<p>Again, please consider explicitly mentioning risk assessment with the DECAF score for patients with COPD (note the patients with COPD exacerbation typically represent the majority of respiratory patients even on general virtual wards)</p> <p>I would be cautious about saying "the person or their carers... skills to be able to use the virtual ward platform" as this perhaps goes against the principles of inclusion and avoidance of health inequalities. The skill requirement for the tech should be very low. If this part is to be retained, it may be worth re-iterating the expectation of easy to use kit in this section.</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 33 on the DECAF score.</p> <p>A recommendation around a simple to use patient interfaces has been added to section 1.2 of the guidance.</p>
35	1	HCP	3.2	<p>The majority of patients in virtual wards are patients with COPD. Patients with COPD may have abnormal baseline physiology, and as such the NEWS2 score is not as good as other severity scores in this population. Essentially they are different tools</p> <p>The DECAF score should be used to risk assess patients and help with identifying suitable patients, and their appropriate care pathway.</p> <p>NEWS2 is a useful tool to monitor deterioration, though in COPD patients it is very important to be mindful of the high rate of false alerts, and the high rates of alerts at baseline. This is especially important if oxygen is being used in the virtual ward, as excess oxygen is harmful, particularly in COPD patients. If a patient with COPD is given too much oxygen, the increase risk in death is substantial- 2 to 3 fold.</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 33 on the DECAF score.</p>
36	1	HCP	General	<p>I am grateful for the opportunity to comment on the Virtual Ward report. My comments are in the online section, and essentially revolve around COPD, the need to risk assess with the DECAF score, and monitoring of physiological parameters in the COPD population and the dangers of excess oxygen.</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 33 on the DECAF score.</p> <p>Although people may have co-morbidities that need to be considered, consideration of risk stratification for heart failure and frailty is outside of the scope of this assessment of virtual</p>

			<p>The DECAF score was specifically designed to help with the identification of patients into Hospital at Home, and has undergone derivation, internal and external validation, and implementation assessment, meeting the gold standard for prognostic research. The RCT we performed included a detailed economic evaluation, but has not been included, I think because it is called “Hospital at Home” rather than a virtual ward. We did use home monitoring in the study (but not continuous home monitoring via a virtual ward platform) which is why I think it has been overlooked, but we costed all aspects, including health and social costs.</p> <p>In addition to my previous email, it has just occurred to me, that maybe there should be a “select populations” section, such as COPD, diabetes, heart failure, frailty and have a short paragraph/ some bullet points on each with what is important with regards to assessment/risk stratification, monitoring and treatment?</p> <p>In this situation you can have the principle of risk assessment/risk stratification, monitoring and treatment, etc in the general section, and then include specifics in select populations. As an illustrative example (please note my heart failure and frailty examples are my own, and experts in these areas may disagree/ offer something more helpful!):</p> <p><u>Select populations</u></p> <p>COPD Risk stratify with DECAF- include DECAF 0-2 patients to virtual ward. (note that for patients with pneumonia and COPD, CURB-65 does not perform as well as the DECAF score) Caution with continuous monitoring of oxygen sats and false positive alerts- when patients move or are sleeping. Need for oxygen target saturations of 88-92%, and avoidance overtreating transient falls in oxygen sats with excess oxygen which increases the risk of death.</p> <p>Heart failure</p>	<p>ward platform technologies for acute respiratory infections. NHS England's guidance on ARI virtual wards recommends multi-disciplinary team working with access to specialist input where needed. Other virtual ward pathways may be more appropriate where an acute respiratory infection is not the primary indication.</p>
--	--	--	--	--

				<p>Focus on monitoring of weight during diuresis Access to point of care measure of U+Es</p> <p>Frailty Assessment with Rockwood frailty score to identify patients Review of polypharmacy and falls risk prior to inclusion in the virtual ward</p>	
37	7	HCP	1.3	<p>We recommend inclusion of objective clinical risk stratification, and specifically the DECAF score, for patients with COPD exacerbation. This includes those with complicating pneumonia. A more detailed comment is included in Discussion: 3.2 Population.</p>	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 33 on the DECAF score.</p>
38	7	HCP	3.2	<ul style="list-style-type: none"> - Risk aversion and clinical pessimism challenge recruitment. Using the best available objective clinical risk stratification tools at presentation should help broaden recruitment (giving clinicians confidence to enrol a patient). - NEWS is mentioned as a tool for risk stratification. The DECAF score offers superior performance to NEWS and CURB65 in patients with COPD exacerbation, including events complicated by pneumonia (Ref: 1,2,3). It is easy to score at the bedside, with no missing data across 2,645 patients in the developmental cohorts (Ref 1,2). - Hospital at home selected by DECAF has been shown to be clinically and cost effective (mean difference in total health and social care costs over 90 days = £1,016, driven by a five-fold difference in bed days), and preferred by 90% of patients (Ref 4,5). Note, within the RCT and clinical service, all patients had been triaged for admission. Although low risk (or intermediate risk in the clinical service) by DECAF, this includes patients with new onset respiratory failure requiring controlled oxygen therapy (many VWs do not include such patients). Patients were supported by at least daily respiratory specialist nurse visits, a 9 pm phone call and 24/7 specialist respiratory on call (e.g. if concern about symptoms/ oxygen sats etc). The term "virtual ward" was not used in the trial, but the Trust applied to NHS England requesting a change to the definition of admission to allow the creation of a virtual ward (agreed support 2015). The current service uses all standard inpatient clinical systems: nervecentre, clinical noting, emeds etc. This RCT 	<p>Thank you for your comment.</p> <p>Please see NICE's response to comment 33 on the DECAF score and NICE's response to comment 23 and 24 on the inclusion of papers relating to virtual wards or hospital at home.</p>

				<p>highlights the utility of objective risk stratification to broaden inclusion.</p> <ul style="list-style-type: none"> - DECAF applies at presentation. In patients with a higher risk score, most deaths occur early, and after an initial period in hospital, those on an improving trajectory can also be considered for H@H/ VW (step down). - Awareness that a patient has a low risk of death can also support admission avoidance in the emergency department. <p>Within our Trust, the proportion of patients admitted with a low risk score has fallen progressively: DECAF derivation (n= 920) = 53%; DECAF validation cohort (n= 880) = 45%; NACAP audit (n= 748)= 37%. In contrast nationally in the NACAP audit, the proportion of patients admitted with a low risk score mirrored the DECAF derivation cohort = 54%.</p> <p>References</p> <ol style="list-style-type: none"> 1. DECAF derivation: Thorax 2012;67:970-6 2. DECAF validation: DECAF;2016;71:133-40 3. DECAF and NEWS: Thorax 2019;74:941:46 4. RCT of hospital at home selected by DECAF: Thorax 2018;73:713-22 5. H@H qualitative sub-study: BMJ Open 2019;9:e026609 <p>These comments are relevant to the assessment report.</p>	
Health Inequality					
39	4	Company	Equality issues	<p>Equality issues across the health sector currently effects the capability and ability to deploy Virtual Ward/Home or Remote Health Technology to every end user.</p> <p>For example, a CQC report highlighted that they could be up to 10,000 care homes that suffered from limited or zero connectivity. Looking beyond the data transfer of any technology to other post and pre enable home help applications, we should also review remote consultation to prove and end to end solution.</p> <p>To enable this end-to-end total care and enhance Equality we should not just focus on the end technology, deliverables, and outcomes but also the resilience and accessibility of the communication path.</p> <p>The communications backbone should be ubiquitous</p>	<p>Thank you for your comment.</p> <p>Additional text has been added to section 3.11</p>

				<p>coverage at the location by any means not just internet. The report does not go into enough detail on the connectivity pathway and means to overcome this challenge or method to mitigate.</p> <p>There is a vast array of connectivity methods from Satellite, 4/5g, IoT and Microwave that can be address for both permeant and temporary applications. The report should cover what could be available and the agility/speed of delivery, resilience, and cost of each application to deliver Equality for all.</p>	
40	5	Member of public	General	<p>I do not see sufficient emphasis on giving access to those potential patients with poor digital literacy - the report says "Some companies also use simplified patient interfaces to make it easier for people who are not familiar with using digital technologies". Sadly I have no evidence to compare level of healthcare need with level of digital familiarity but I strongly suspect there is a strong inverse relationship.</p>	<p>Thank you for your comment.</p> <p>A simple patient interface has been added as a key feature for virtual ward technology platforms in section 1.2 of the guidance.</p> <p>Collection of health inequality information has been added to demographics in section 1.3 of the guidance.</p>
General					
41	9	Company	General	<p>Thanks for sharing the draft report, I can confirm Current Health doesn't have any comments.</p>	<p>Thank you for your comment.</p>

"Comments received in the course of consultations carried out by NICE are published in the interests of openness and transparency, and to promote understanding of how recommendations are developed. The comments are published as a record of the submissions that NICE has received, and are not endorsed by NICE, its officers or advisory committees."