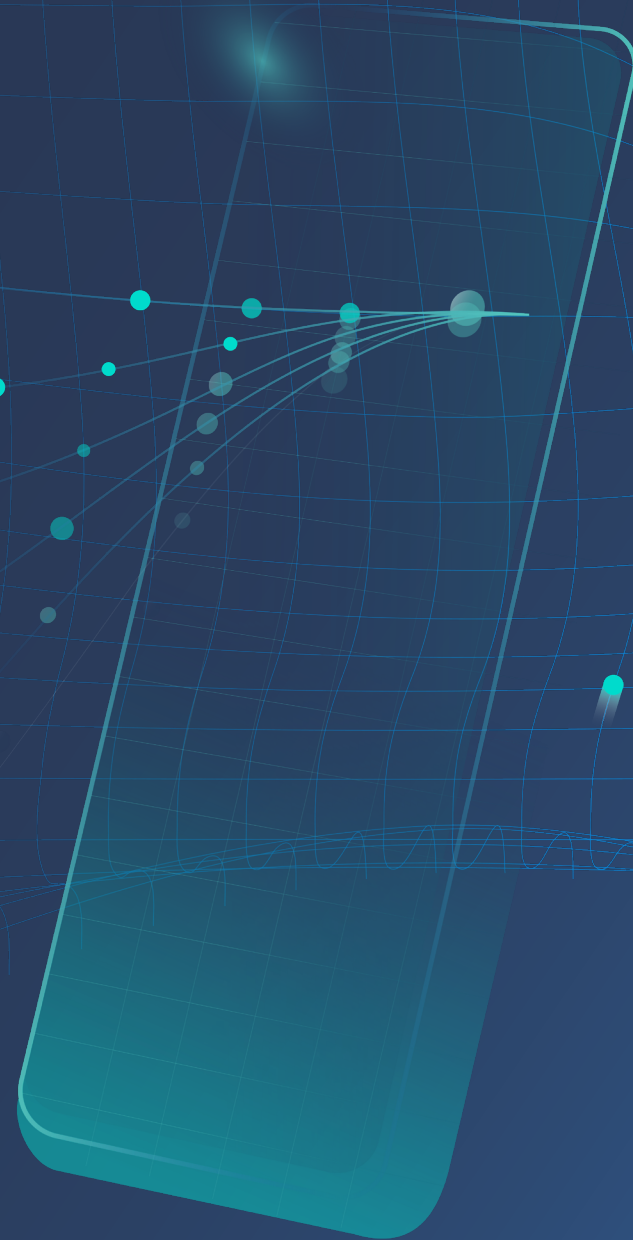




AI symptom assessments and beyond:

The guide for health systems



Welcome to the conversation.

So, you've established that your organization could benefit from an artificial intelligence (AI) based health and care platform. Maybe you want to provide symptom assessments, care navigation and clinical decision support, or open the 'digital front door' as it's often called.

You're entering an exciting, innovative, and potentially rewarding segment of digital health technology. In this emerging and fast-growing market, your immediate challenge is to figure out who you want to partner with and why.

At Ada, we believe successful partnerships in digital health will benefit the industry as a whole.

Choosing the right partner, first time, can offer you an incredible opportunity to drive positive change, improve your users' health outcomes, and increase operational efficiency across your health and care landscape at pace, and at scale.

This guide gives you the expert information, the right questions, and an open-source testing toolkit to make the right choice the first time.



Step 1:
Build a foundation
for success



Step 2:
Mind the medical
quality gap



Step 3:
Consider your
users' experiences



Step 4:
Align on vision
and values



Step 5:
Embrace regulation
and compliance



Step 6:
Look forward
to tomorrow



**Your checklist
for success**



**Clinical vignettes
to test your options**

01.

Build a foundation for success

To hone in on the type of solution you need,
you'll want to nail down the basics.



Step 1.

Get a clear understanding of your use case

Use cases can be very different. It's worth doing your homework so you can better establish the type of solution that will best fit you, your users, and your ambitions.

You may be looking to offer users a 'digital front door' experience or something more comprehensive. In some instances, a simple, plug-and-play, decision tree-based symptom checker solution might suffice, but these tend not to be future proof. It's likely that you'd gain long-term value by considering a more advanced AI-based solution that leverages probabilistic reasoning.

Expert-written decision tree	Machine learning-models	Ada's AI
Pre-written pathways, non-contextual, can end prematurely. Limited by human tree writing.	Contextual, but imitate human questions, without connection to underlying working hypothesis.	Contextual, based on most likely differentials after every question. Imitates human question strategies.
Advice accurate at low resolutions (e.g. emergency yes/no).	ML models have the potential for high output accuracy.	Safe and accurate advice outputs.
Tends to get too complex to be kept under control, putting safety at risk when scaling.	Automated learning works well for scalability often at the expense of safety: the system can change beyond human control.	Based on human built medical knowledge. Balance between automation and human control ensures safety and medical quality at scale.
Very transparent at low resolution, but when scaling the transparency gets quickly obfuscated by the increasing complexity.	Very low transparency. A black box, difficult to explain and audit.	Transparent at high resolution. A white box system where every case can be analyzed in detail.

Figure 1. Digital symptom assessment technology options



Step 2.

Consider your user journey, start to finish

What will happen after users enter your digital front door? Consider how different solutions would integrate into your existing service. Agree on how much of the heavy lifting you, as a client, can take on when integrating this technology.

You may be looking for a solution that's already been proven to work effectively as it is. That will be quick and easy to integrate. Perhaps you want the ability to build new internal interfaces on the platform yourself. Either way, understanding your tech needs and supplier capability is critical.

So is establishing the degree of interoperability you need from your supplier.

Step 3.

Assess how suppliers would operate within your context

The sector and geographies you operate in come with their own requirements, challenges, and considerations.

- Do your prospective partners understand your sector and geography?
- Do you need a single-market tool, or a global one?
- Do you need language localization?

Let's consider your user context too.

“There is a need for more effective information sharing between care settings, organisations and geographies, as well as between professionals and citizens, to optimise patient outcomes and quality of care.”

– NHS England, 2019¹



Step 4.

Get down to brass tacks

From earlier intervention to more efficient service redirection, the financial benefits of integrating a symptom assessment tool can be significant.

Prepare for this conversation with a clear understanding of what your return on investment should be, and be prepared to share this. Are you looking for a fee-for-service solution, or one that is more value-based?

With your suppliers' assistance, define value and establish your metrics early on. How you will both report return on investment. Define your metrics to measure ROI. Consider a range of impacts, such as number of redirects, less out of network care, reduction in avoidable urgent care, and increased user engagement.

Different suppliers come with different prices. Ask how they justify their price points and what they can commit to for your budget. Confirm they will deliver everything within your intended scope.

Step 5.

Don't shy away from difficult questions

As well as knowing the ROI you're looking for, be prepared to ask prospective partners the right questions about their business interests.

You may also gain insights from asking your wider network.

59%

of healthcare executives surveyed expect their organizations will see a full return on their AI investments in under 3 years.

– Optum, 2020²



02.

Check for evidence of accuracy and medical quality

When it comes to healthcare, medical quality underpins absolutely everything. A high-quality solution should improve experiences and outcomes, and reduce costs.





Step 1.

Choose a solution your users will trust, just like they would a doctor

Your users rely on you to give them the right advice. Medical quality is essential to ensuring that the assessment and advice is accurate and safe.

Whatever tool you adopt will become an extension of your existing health services, so you need something your users can trust and that will navigate to the right clinical setting for a specific condition.

- ✓ Few structured frameworks exist for measuring healthcare AI, so how do you assess user trust?
- ✓ Consider checking 5-star reviews, user testimonies, and net promoter score. Speak to their other partners. Measure uptake and usage elsewhere.
- ✓ When thinking about medical quality, evaluate a range of areas.
- ✓ Above all – test it yourself.

If you select an unreliable or unsafe tool and it slips up, you may face risks to patients and an erosion of trust in your organization.

Step 2.

Know your use case, and where quality matters for you

Different solutions will have different strengths. When thinking about medical quality, you should be considering evaluating a range of areas, including condition coverage, advice coverage, advice accuracy and urgency, and safety, then apply these to your particular use case and objectives.

Consider your typical and atypical use cases, and how your supplier performs on each of the above.

For example, will your prospective partner's solutions be equipped to provide advice covering mental health conditions and difficult to diagnose diseases? What, then, is the advice in these situations: is it accurate, is it safe? And are users being directed to appropriate services based on their needs?

Localization and personalization can also impact quality for your users. If you're operating in multiple geographies and languages, check the solution offers quality translations, and that translations have been undertaken and checked by native-speaking clinicians within their medical context. Language barriers and poor translations can be a huge quality block. Don't settle for translation: user experiences should be delightful in all languages, not just English.

Consider whether the assessment will actually guide users to the most appropriate care. A solution's lack of medical quality could actually result in less accurate advice and increase traffic to inappropriate services such as emergency care.

Ask suppliers for their views on the roles of AI, ML, and human clinician review in ensuring user safety. There are critical considerations in healthcare AI that must have human involvement, and a supplier should be able to articulate their reasoning.

“Regardless of what part of the continuum of care the [digital health] product addresses, a validation study must compare it to relevant clinical gold standards.”

– Mathews et al, 2019³



Step 3.

Identify, and scrutinize, the existing evidence

There's a lot of information out there. In the absence of global benchmarks, the onus is on you to scrutinize the evidence.



Black box: ML models that are hard to explain and to be understood by experts in practical domains.

White box: ML models that are easier to understand by experts in the application domain. Usually, these models provide a good trade-off between accuracy and explainability.⁴

Don't stop there. Investigate. Independent reviews, peer reviewed and published research, and medical and scientific journals are reliable sources.

Step 4.

Try before you buy: conduct your own internal assessments

To really assess quality, develop a tailored evaluation process that reflects your use cases. Test for common, uncommon, and rare conditions against your own clinicians 'gold standard' diagnosis and triage advice.



Make sure the solutions work with rare diseases. Rare means that fewer than 5 in 10,000 people are affected – that's over 300 million people worldwide.⁵

Testing with realistic and independently validated clinical scenarios, or vignettes, is a strong approach. Review how the advice matches against your expectations. Ask your clinicians to provide internal guidance on accuracy and safety of condition advice, diagnosis, next steps, and compare to current approaches, such as triage nurses.

Peer reviewed research suggests that Ada offers the highest accuracy assessment <https://bmjopen.bmj.com/content/10/12/e040269>, and a study recently found that Ada offers triage advice comparable to that of triage nurses <https://pubmed.ncbi.nlm.nih.gov/33170799/>

Looking at your own care workflows and pathways, will the solution help you effectively and safely triage to the appropriate services? Be aware of the challenges that could come from over-and under-triage to services that are ill-equipped.



Using vignettes to test potential solutions against gold standard practice is essential to evaluate performance against your expectations – just make sure they're independently designed, and fairly represent your users' medical needs.

See page 24 for guidance on testing clinical scenarios.

Step 5.

Ask questions, and don't be afraid to challenge suppliers

Take the results from your own tests and use them to challenge suppliers.

Start a dialogue about medical quality, what they're doing to ensure they are 'best in class', and just how seriously they are taking this.

Identify suppliers' motivations. A supplier who is focused on setting new standards and driving the industry forward is more promising than someone who is simply focused on revenue.

03.

Consider your users' experiences

If you want your users to buy into the solution you're offering, you need to think about their journey. Put simply, positive user experiences result in higher adoption and retention, and more value for you.



Step 1.

Understand your users' needs, and identify what could be improved

Picture your ideal user journey, then revisit what you currently have in place. Your users will access your solution from wherever they are, whenever they need it, 24/7. Plan how local services will be accessible or how the supplier can navigate users outside of normal clinic hours.

Mapping the user journey is a big task, but it's crucial to identify the solutions that will have a real impact. Be as specific as you can and identify the gaps between your current and ideal user journey.

- What's missing?
- What can improve?

Based on this, determine your goals.

- What do you want to achieve with the new solution?

Step 2.

Experiences that build trust are essential

Without an experience that builds trust, your users won't follow the advice they receive. Tone is important: the right solution will combine expertise with a tone that is reassuring and approachable.

Think carefully about detail and length. You might believe a shorter assessment will boost completion rates, but a longer question flow can build trust and improve accuracy, and enable triage to the correct services the first time around.

Lastly, look at how your supplier communicates with their users on key issues, such as privacy and confidentiality, and whether they cater to cultural sensitivities within regional offerings, such as approaching questions about alcohol consumption sensitively in countries with alcohol prohibition.

Step 3.

Think seriously about integration and set your expectations

Ensure integration is top-of-mind so that you can deliver a seamless journey that meets your goals. Decide at which stage of the user journey you'd like the solution to be used, and think about the role you need it to play within the wider system.

Don't forget to review the onboarding experience. For the solution to have maximum impact, you need your users to be engaged and confident from the outset. Discuss it with your supplier and test it out for yourself.

“When users see a technology as effective, they begin to trust and use it. Health domain is all about trust, and efficacy principles will be key to getting chatbots adopted.”

– Biplav Srivatsava, Professor of Computer Science, AI Institute, University of South Carolina speaking in the World Economic Forum's 'Chatbots RESET', 2020 report.⁶



Step 4.

Consider the importance of customization

Ask suppliers how they will adapt to meet your specific audience and needs.

Ask about interface customization and have an idea about what would work best for you. It may not always be possible, but it's worth discussing your ideas and determining the reasoning either way.

At the end of the day, you want a unique experience for your users that builds on your existing brand credibility.

Step 5.

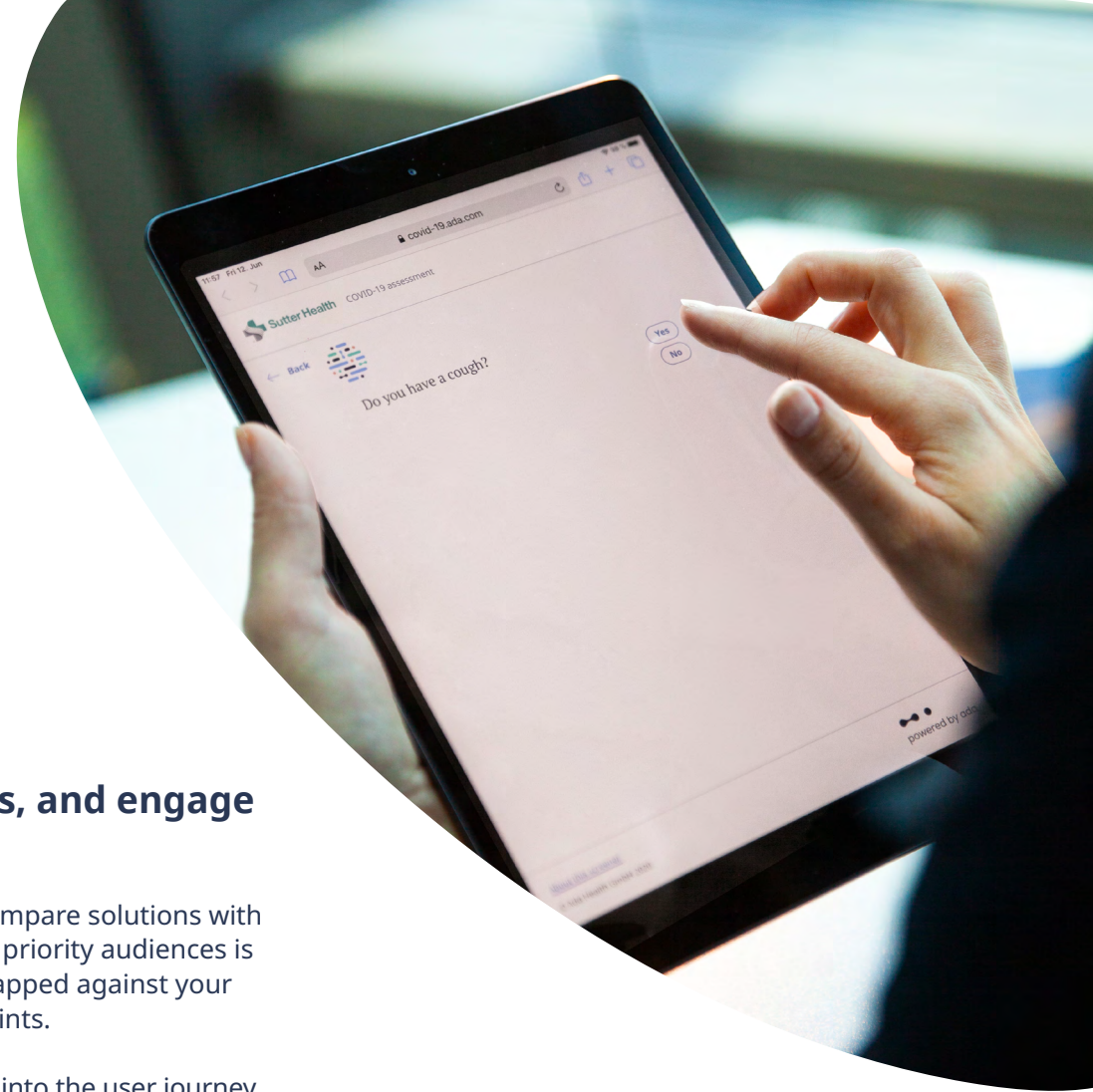
Test out the options, and engage your users

Engage your users as you compare solutions with one another. Feedback from priority audiences is valuable, especially when mapped against your existing journey and pain points.

Review quantitative research into the user journey and note where users drop out. Investigate why this happens through qualitative research, such as one-to-one sessions with users.

Ask your supplier to share their user insights. If their user research team is happy to answer your questions, that's a great sign.

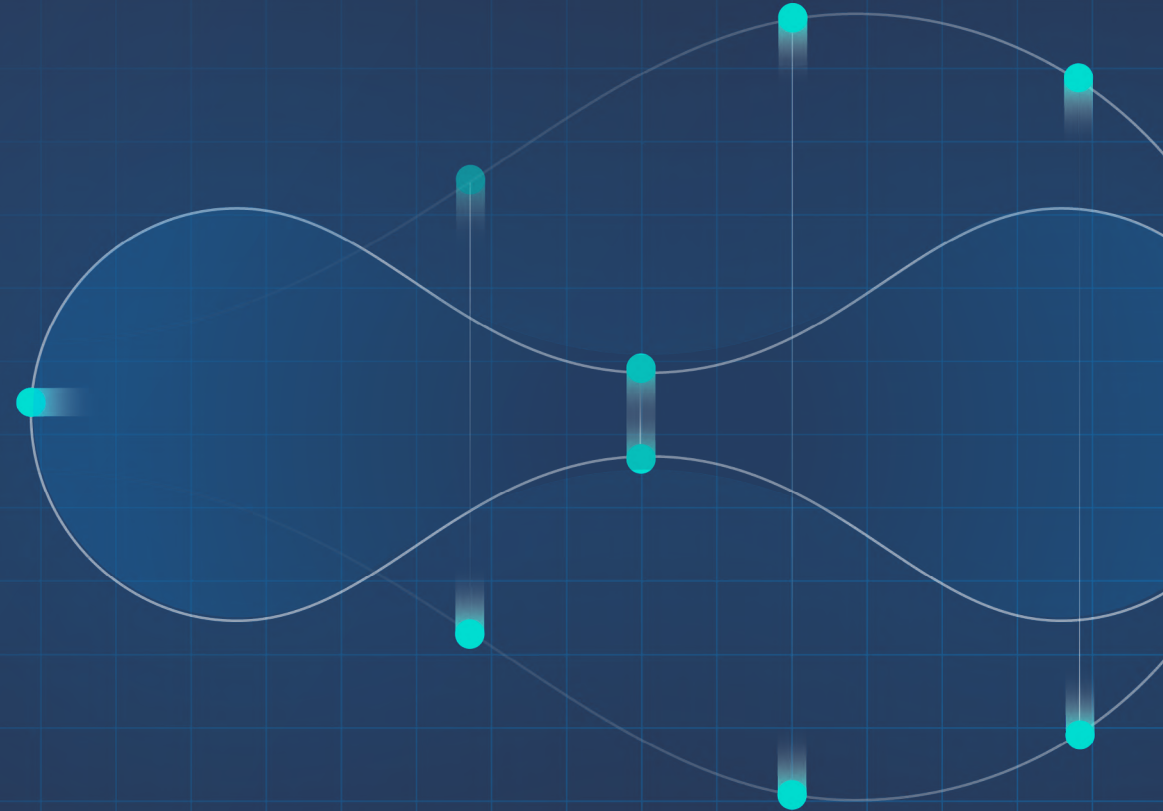
You can try Ada's user experience anytime by downloading the free consumer app for [iOS](#) or [Android](#).

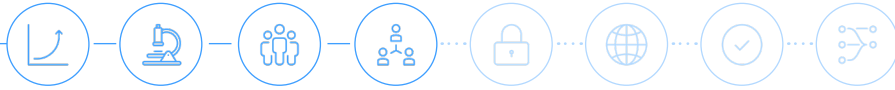


04.

Align on vision and values

In such an uncertain and rapidly evolving field, one thing you can bank on is values. Selecting a supplier whose vision matches your own is key to reducing uncertainty, and aligning on values is vital groundwork for long-term success.





Step 1.

Know your own values and expectations

Identify your values and be prepared to stick to them. With these in mind, consider what you expect from a partner and where your boundaries lie.

Chances are that you care deeply about your users, so you'll want to work with a partner that values them as much as you do. Who you choose to partner with, and the values they hold, will impact your users and your reputation.

Step 2.

Interrogate the values your supplier claims to have

Ensure your supplier can articulate their values, vision, end goal, and where they see themselves within your ecosystem.

Don't be afraid to interrogate their ethics, how they prioritize them, and how these are reflected to their users and partners.

“There is a significant opportunity through new technology to support the role of doctors and provide solutions to existing problems but careful consideration must be taken with regards to the safety, societal, legal, educational and ethical implications it presents.”

– Position statement, Royal College of Physicians, 2018.⁷



Step 3.

Look for evidence of their values in action

Ask for evidence of how their values are reflected in the partnerships, products, and features they build. Then, try out the products and analyze testimonials for yourself to see whether you agree.

A company's values should be ingrained at every level of its culture, so ask about internal processes.

Lastly, identify the suppliers who take this a step further, sharing their vision and values proactively to support and champion the wider industry.

Step 4.

Don't strive for perfection, but seek collaboration

Digital health is maturing as an industry, but it's still nascent. Look for a partner who has a strong foundation and whose technology will develop and grow over time to support your needs as they evolve.

Ensure they are willing to be open and honest about success metrics, so you can interrogate and learn from these to evolve your offering together. As partners, you need to be able to work together and hold each other to account.

Looking at how a supplier collaborates with the industry will help you here:

- Who do they partner with?
- Are they willing to collaborate with competitors on other projects such as industry guidelines?

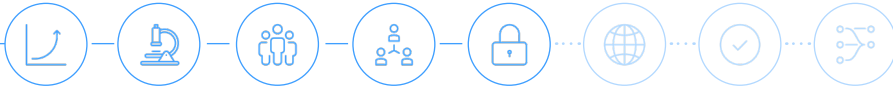


05.

Embrace regulation and compliance

Digital health regulation is a complicated field. There's a lot to consider, but ensuring a commitment to the highest possible standards couldn't be more important, for both your business and your users.





Step 1.

Do your homework: understand why this matters, and what's at stake

A good compliance set-up means no surprises. Otherwise, you could be putting your users' safety and privacy at risk. It might even mean that you are liable for any product failings or shortfall, leading to costs, reputation damage, and mistrust. To avoid this, start by engaging the right people within your organization and identifying your criteria.

Review your existing compliance operations and challenges, from local requirements and policies, to hosting needs, data privacy and patient safety.

Step 2.

Build out your checklist, and be thorough in your approach

Speed up the process by building out your checklist before you engage. Have confidence that if a supplier meets these basic requirements, they'll make a mature partner.

For quality, consider international quality badges and requirements, such as GxP or ISO13485, and whether, they follow the recommendations of the IMDRF.

For data privacy, check how they comply with GDPR, HIPAA or CCPA and International Organization for Standardization (ISO) to name a few.

Think holistically about other regulations that matter, such as the American Disabilities Act.

Step 3.

Dig a little deeper: identify the partners who take this seriously

Ensure your supplier can articulate how they value, and prioritize, compliance at every level of the business.

Ask upfront about the standards and best practices they follow. If they know their stuff, they'll have a list to share with you right away.

Identify what their compliance setup looks like, and what teams, such as medical safety, regulation, and clinical evaluation, are involved in the process, both in-house and externally.

- ✓ Differences exist between international and regional regulations and compliance requirements. GDPR and CE Medical Device Regulation in Europe; UAE's Health Data Law; FDA guidelines, HIPAA, CCPA in the US; and International standards (ISO) to name a few. Ensure your supplier can support your local needs.



Step 4.

Choose a dynamic supplier who can partner with you

Ensure your supplier has a dynamic, reactive, and responsive compliance set-up, to work with you in real time. That will be essential to post-market surveillance, and may require an in-house team.

Start an open dialogue: your regulatory needs may differ to those of your supplier, so prepare to dissect these together.

Step 5.

Make sure you're thinking about the long-term

Digital health regulation is still a novel space. Many existing regulations were designed for hardware rather than software, meaning we can expect significant change in the years to come.

With this in mind, ensure the solution you select is not only reliable but also sustainable.

Find a partner who is meeting today's regulatory requirements, whilst also actively engaging with the standards of tomorrow. That'll ensure your compliance needs are in safe hands for the long term.

The World Health Organization's AI for Health program, involving AI experts and leading suppliers, is developing benchmarking criteria. Compliance by design, safety, and security.

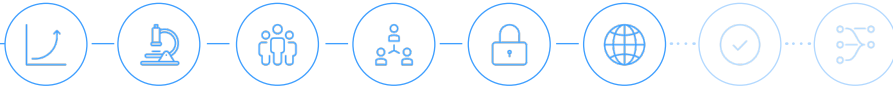
– AI4H focus group, WHO, 2019.⁸

06.

Look forward to tomorrow

As digital health technology evolves, so too does the healthcare landscape. Adopting an AI-powered symptom assessment solution is an important step towards building a more digitally empowered organization, but it won't be the last. Here's how to think about the long-term.





Step 1.

Balance today's needs with tomorrow's digital demands

Imagine: where do you see your organization in 5 years, and how will your needs evolve?

Revisit your use cases for selecting a solution and partner. Don't just think about the present use case when deciding on an AI-based symptom assessment tool. Consider how your operating model and end-to-end patient journey might look further down the line, particularly as digital health technologies are more widely adopted.

Ensure that potential solution partners can articulate how they can add value today, but also ask how they might support your future needs.

Step 2.

Recognize the long-term value of sophistication

Less advanced solutions, such as simple decision-tree style tools, might fit your immediate needs, but will likely limit potential opportunities for the future.

Meanwhile, more comprehensive solutions may come with a higher price point, but offer wider long-term applications, multiple use cases, and more future-proofed technologies.

Only you know which present and future priorities are most important for your organization. In the long term, however, opting for more technologically advanced solutions may be more cost-effective than you think.

Step 3.

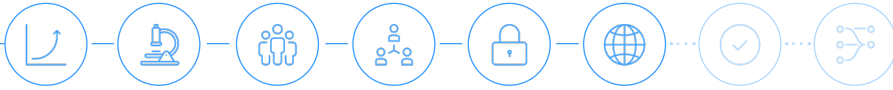
Identify tomorrow's market leaders

In a rapidly evolving digital health landscape, the suppliers with market-leading potential and long-term ambition will be those working to define best practice for the rest of the field.

A commitment to tackling deeper industry challenges is a good indication of this.

Equally, tomorrow's leading symptom assessment solutions will be those striking a good balance between technologists and clinicians at all levels of the company.

✓ This is not a case of AI vs. clinicians. Collaboration means that good AI supports, instead of trying to replace, your care providers.



Step 4.

Find a partner whose technology you trust, but leaves scope for future innovation

Selecting an ambitious, future-oriented digital front door, symptom assessment, and care navigation partner will give you the opportunity to influence the direction of new tools and technologies that will best serve your organization in the long term.

Look for partners who are willing to work together, are unafraid to iterate, and are open to improving systems in the future with you.



As the adage goes, to plan for the future, look to the past. It's worth investigating how a supplier has adapted to previous unforeseen challenges, and how nimbly and accurately they were able to do so.

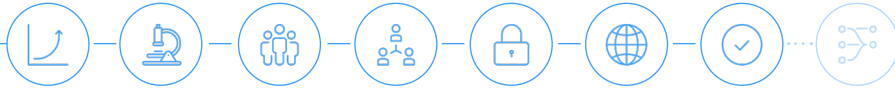
Step 5.

Look for signs of flexibility and adaptability

A long-term partnership requires adaptability and resilience. This is particularly true in the world of healthcare.

Circumstances can rapidly change so select a partner with an eye on the future – both their own, but yours too.





☒ Your checklist for success

This supplier meets my users' needs:

- ☐ Provides for the age ranges, accessibility requirements, and ICD-10 codes I need
- ☐ Is committed to putting better health experiences first
- ☐ Proactively protects data privacy
- ☐ Combats design and data bias in their solutions
- ☐ Can scale their solution to support my end users as the organization grows
- ☐ Doesn't exclude high-risk health categories, such as pediatrics, obstetrics, and mental health

This supplier develops the right technology:

- ☐ Can deliver within my timeframe
- ☐ Offers white box AI for transparency and accountability
- ☐ Ensures safety through continuous human clinician review, not ML
- ☐ Supports single sign-on
- ☐ Integrates with electronic health/medical records (EHR) or my third-party solutions
- ☐ Is advanced enough for my users' needs with probabilistic reasoning rather than a decision tree

This supplier aligns with my values:

- ☐ Has a comprehensive business plan that gives me confidence
- ☐ Helps me stand out in the right ways, for example, the halo effect of a reputation for medical accuracy and innovation
- ☐ Will provide me with the right client support resources throughout and after a project

This supplier is an industry leader:

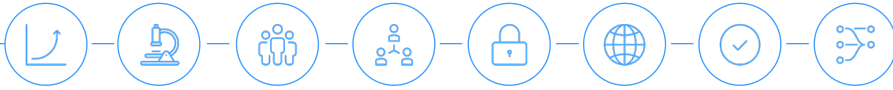
- ☐ Is known and trusted within my peer network
- ☐ Can support their claims around accuracy
- ☐ Is invested in making a positive impact on global healthcare
- ☐ Has a vision for the future of health that supports my ambitions

This supplier takes regulation seriously:

- ☐ Follows medical device regulations
- ☐ Meets my local compliance requirements
- ☐ Has the appropriate international and local regulatory certifications
- ☐ Takes accountability and retains liability for medical quality

This supplier is equipped for the future:

- ☐ Technology will not become quickly outdated
- ☐ Can articulate their future vision and value
- ☐ Continuously adapts solutions in the face of new challenges
- ☐ Regularly updates their models with the latest medical knowledge



Clinical vignettes to test your options

Open-source clinical vignettes are an effective, objective resource you can use to test accuracy and medical quality yourself.

Create some realistic scenarios to test, or access some existing clinically validated vignettes from published research in:

[The British Medical Journal](#)

[The Medical Journal of Australia](#)

Suggested approach:

- 1 Download consumer-facing symptom assessment apps or visit web versions provided by those partners you are considering.
- 2 Create a user profile based on the clinical vignette you have chosen.
- 3 Run through the question flow.
- 4 Record the results suggested at the end.
- 5 Present your findings to a clinician who is supporting your decision.



Hello, Henry



Condition scenario

- Pulmonary embolism
- Patient: Male, age 65



Chief complaint

- Acute onset of short of breath, 30 minute duration

Complaints on questioning

- Felt faint but did not lose consciousness.
- Chest pain on left side, worse when breathing in.
- Has a swelling on left calf which is painful.



Medical and family history

- Total hip replacement 7 days prior, followed by 3 days of bed rest
- No family history of cardiopulmonary disease
- No allergies reported



Physiological measurements

- Has a fever of 100.5°F (38.0°C)
- Slightly elevated heart rate 112bpm
- Blood pressure in normal range 95/65mmHg
- O2 saturation on room air of 91%



Gold standard care advice

- Requires emergency care

At Ada, we're helping improve health experiences and outcomes for millions of people worldwide and supporting our partners to deliver efficient and connected care.

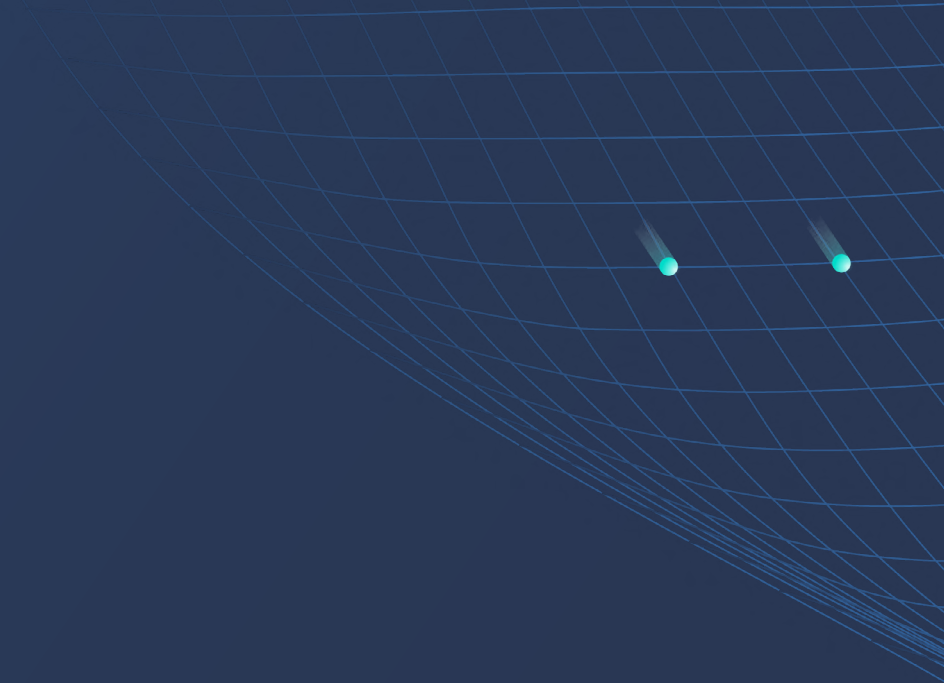
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This paper is the result of numerous discussions between a handful of Ada experts.

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Hi, we're Ada.

Let's continue the conversation. Ask us what the right AI health platform can do for your organisation and users.

Get in touch at ada.com/contact

ada.com

