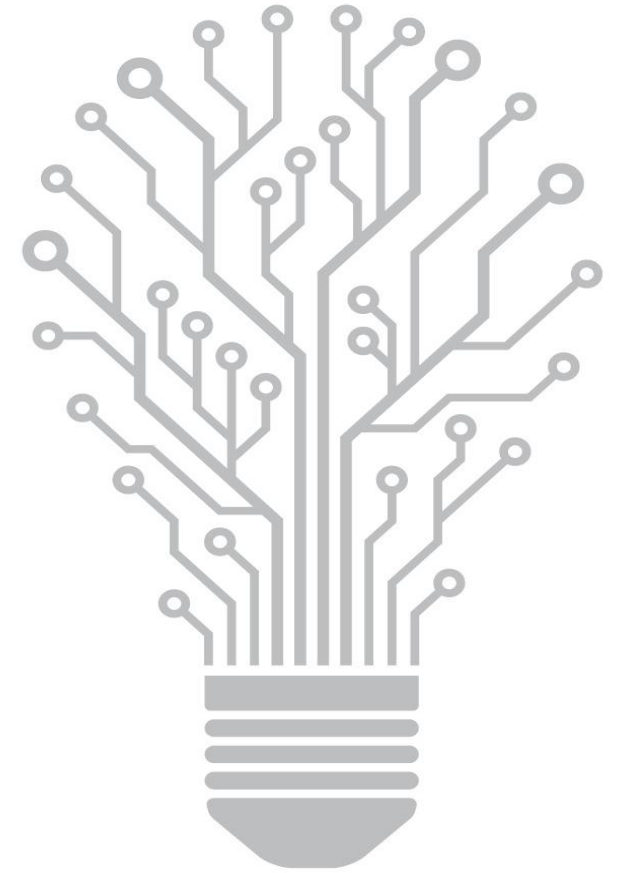


# Digital Health Measurement in Ontario



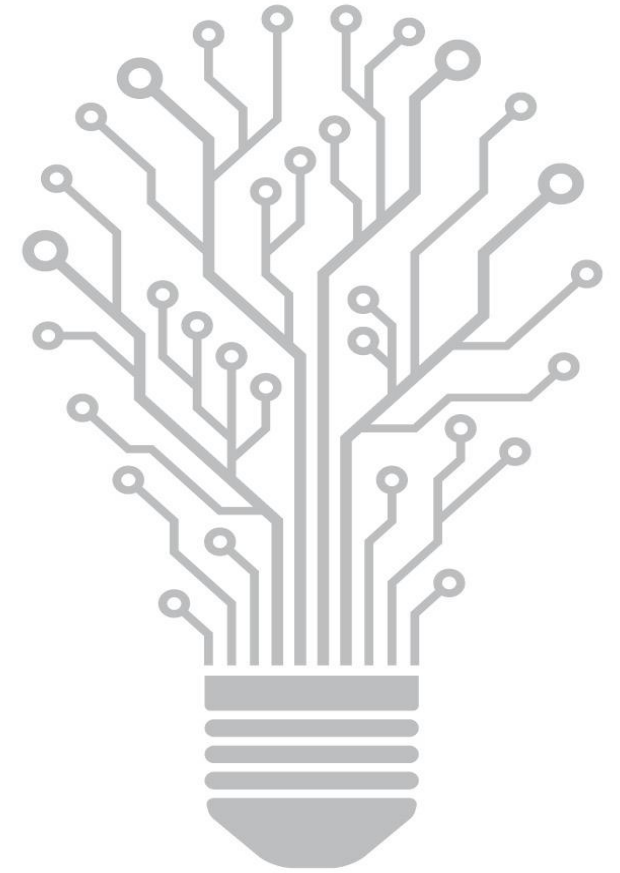
Recommendations from the Centre for Digital Health Evaluation

Provide insights to support the DHS's revision of their data measurement and collection strategies to ensure **alignment, accountability, and progress** across provincial digital health activities, through:

- 1** A **dictionary of terms** on digital health measurement, implementation, and evaluation (see attached document)
- 2** A **monitoring and accountability framework** for digital health investments (contained herein)
- 3** Guidance on **operationalizing the above measures** (contained herein)

- Part 1. Slide 4.** Contextualizing monitoring and reporting within the process of technology development and adoption;
- Part 2. Slide 9.** Process, framework, and analysis considerations for monitoring digital health tools;
- Part 3. Slide 16.** Deciding whether to monitor digital health tools;
- Part 4. Slide 19.** Data collection strategies and considerations;
- Part 5. Slide 34.** Examples; and
- Part 6. Slide 45.** Additional materials.

# Part 1. Contextualizing monitoring and reporting within the process of technology development and adoption



# Contextualizing monitoring within DHT development

Stage	Formative Research	Validation	Evaluation	Monitoring & Reporting
Driving question	Does technology have a role in solving a problem in the system?	Does the technology perform its functions to appropriate standards?	Does the technology add value and address its stated need?	Is the technology performing as desired?
Data Source	Academic and grey literature, interviews with key stakeholders	Heuristics, usability, simulation/pilot tests	Controlled and pragmatic, real-world testing	Reporting

# Positioning monitoring within technology maturity

Associated process	Technology Readiness Level (TRL)	Description	Assessment type	Assessment Considerations
Health Technology Assessment/ Procurement	TRL 9	Spread and scale to other clinical environments	<b>Monitoring &amp; Reporting</b>	Spread & Scale (changes in systems) <b>Impact (Quadruple aim, safety)</b>
	TRL 8	Implementation/ integration into local clinical practice		Feasibility (changes in process, cost)
Clinical evaluation	TRL 7	System evaluated in clinical environment	<b>Evaluation</b>	Impact on process/ outcomes (Quadruple aim)
Usability testing Rapid pilot testing Value proposition design	TRL 6	System/ subsystem model in clinical environment		<b>Validation</b>
	TRL 5	Component and/or broad validation in clinical environment	Safety Stability and consistency Adherence to standards/ regulations	
Clinical validation	TRL 4	Component and/or broad validation in lab environment		<b>Formative Research</b>
Prototype development	TRL 3	Proof of concept Critical functions enabled		
	TRL 2	Technology solution conceptualized		
Basic technology research	TRL 1	Gap analysis; Basic science principles observed/ reported		

## Technology Readiness Level 4-5

Before procuring or investing into spread and scale of a solution, the digital solution should be...

- 1 Clinically validated** to ensure it performs at the required performance level (e.g. accurate readings); and
- 2 Usable** (e.g. easy to navigate)

If not, we recommend conducting validation and usability testing.

- This will promote uptake of the solution by potential users and ensure its performance to a minimum safety and quality standard.

## Technology Readiness Level 6-7

Before procuring or investing into spread and scale of a solution, digital technologies should have been **evaluated in a *contextually relevant*\* clinical system** either in Canada or elsewhere.

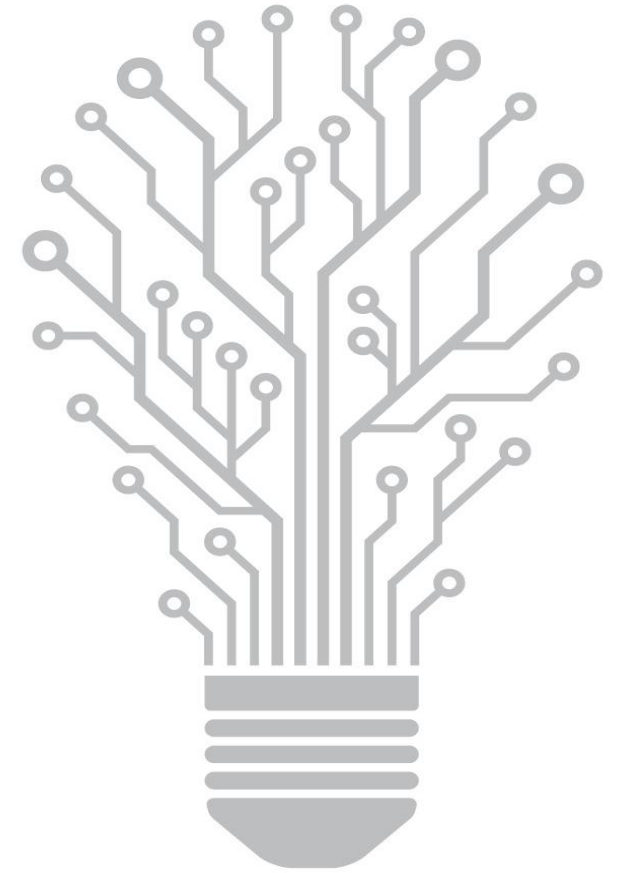
If it has not, we recommend conducting a small-scale evaluation in a small representative clinical setting to understand its potential impact across the quadruple aim and its safety. If this is not possible (e.g., in large infrastructural investments such as the Diagnostic Imaging Common Service), we recommend developing a particularly stringent monitoring and reporting strategy that includes the potential for divestment.

This will promote financially responsible investment decisions, indicate which metrics should be monitored continuously, and enable you to set out target metrics to ensure value is achieved at spread and scale.

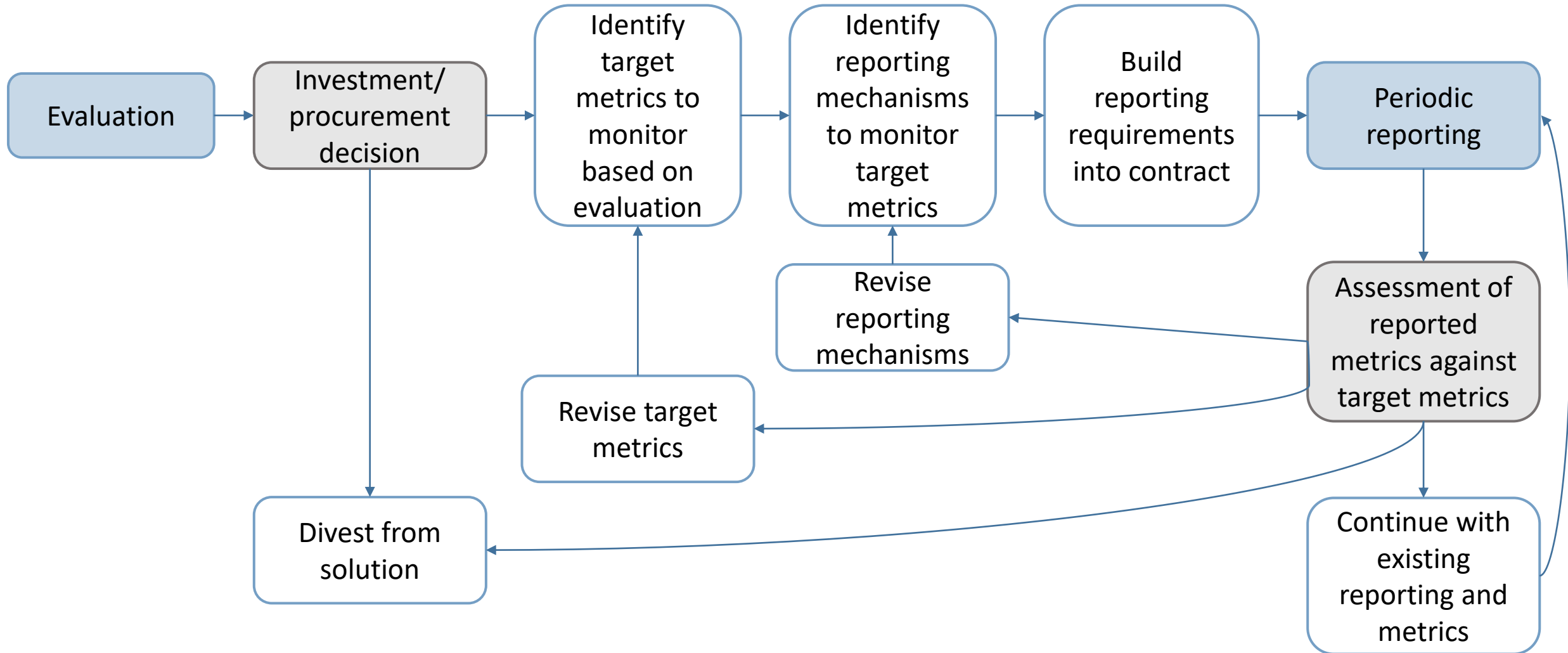
\**Contextually relevant* indicates that the evaluation must have been conducted under a similar set of circumstances to those proposed for spread and scale (e.g., same clinical model, funding structure, and patient population).



## Part 2. Process, framework, and analysis considerations for monitoring digital health tools

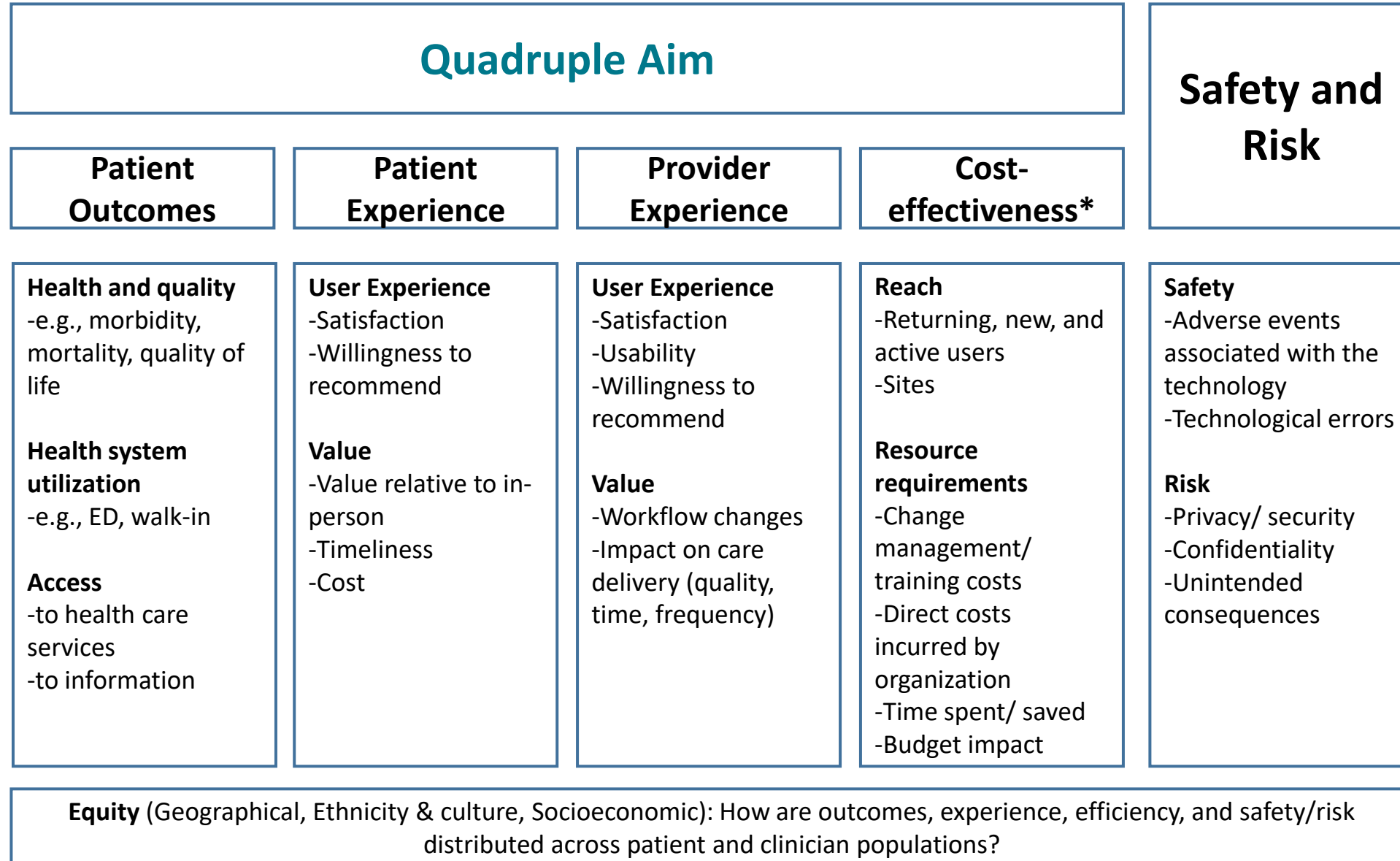


# The process for monitoring and reporting



# Reporting Framework for Monitoring DHTs

What should we measure?



\*Note that cost-effectiveness is represented by the value of the solution as determined by reach, or patients outcomes / experience. See slide 12 for details.

# What metrics are measured in Ontario and globally?

	Ontario			NHS Digital Evaluation Framework	WHO Monitoring and Evaluating Digital Health Interventions	Health IT Meaningful Use Systematic Review
	Investment Management Framework	Digital Health Scorecard	OHTAC			
<b>Patient Outcomes</b>	✓	✓	✓	✓	✓	✓
<b>Patient Experience</b>	✓	✓	✓	✓	✓	✓
<b>Provider Experience</b>		✓		✓	✓	✓
<b>Efficiency</b>	✓		✓	✓	✓	✓
<b>Safety and Risk</b>	✓		✓	✓	✓	✓

- 1** Calculate within context of **potential user base\***: what proportion of the total population could benefit from this tool?
- 2** What proportion of this population currently has access to it?
- 3** Of those who have access, how many are using it?
  - How many are new users?
  - How many are active users? (solution-specific, should be defined in contract)
- 4** Compare active users to low users and the overall number of invited users

\*Potential user base can be sites, clinicians, patients, and/or administrators. Often you will want to consider multiple, e.g. number of clinicians and number of patients using eVisits for primary care.

- **Morgan et al., 2017 Synthesis of decision frameworks for healthcare interventions:**
  - Size of resource requirements (initial and ongoing)
  - Cost-effectiveness of intervention compared to alternative/standard of care (defined based on value metrics)
- **NICE, 2017 Assessing Resource Impact Process Manual:** Pages 11-21 map out principles and processes of assessing resource impact (with data sources), including:
  - Population
  - Incidence and prevalence data
  - Establishing current activity
  - Establishing future practice
  - Activity and unit costs (technology, implementation, process and outcome efficiencies)

## Value for Money

- Cost-consequence, cost-benefit, budget impact, system value: **must be considered in context of the benefits on patient outcomes and experience**
- Patient costs should be quantified where possible (e.g. cost of missed work time)

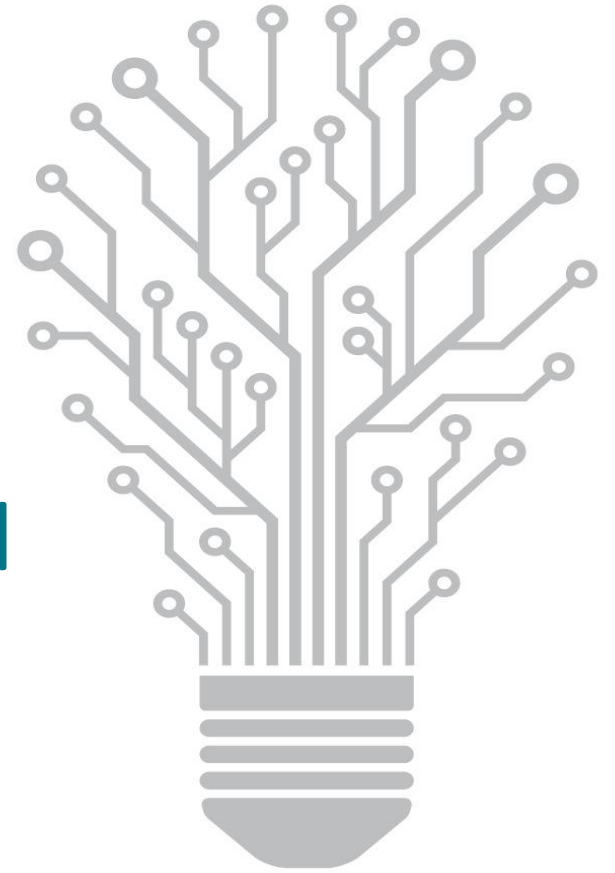
# Reporting on costs

	Establishing Costs		Maintenance Costs		Cost-effectiveness/Impact*		
	Technology	Implementation	Technology	Implementation	System efficiencies	Outcome efficiencies	Patient-reported costs
Metrics	Capital investment in technology (development or purchasing)	Training Change management	Subscription fees Maintenance/ updating costs	Additional time/ human resource requirements	Impact on clinical processes e.g., time per visit, number of in-person visits, E.D., medications	Impact on patient outcomes	Impact on patient spending on healthcare e.g., parking, transport, medications
Data source	Purchaser	Implementer	Purchaser	Implementer	Clinic/ clinician	Patient record	Patient
Feasibility/ reliability	High Should be clear in advance of procurement or investment	Medium Depends on who is incurring these costs; higher if directly paid by the MOHLTC	High Should be clear in advance of procurement or investment	Medium Relies on self-reporting from health institutions	Medium Relies on self-reporting from health institutions	Low Requires nuanced evaluation that can differ per patient	Low Requires contacting patients directly for reporting

\*Comparison to alternative technology/ standard of practice

Example study: [Costs of Digital Health Care Model in Sweden](#)

## Part 3. Deciding whether to monitor digital health tools





# Factors influencing whether to monitor DHTs

Digital health tools vary drastically in their functionalities and level of integration with the system. Reporting requirements must adapt and reflect those variations.

## **Who is the payer?**

See proposed flowchart on whether reporting is required for Digital Health Technologies (See slide 18; Appendix 1 for examples)

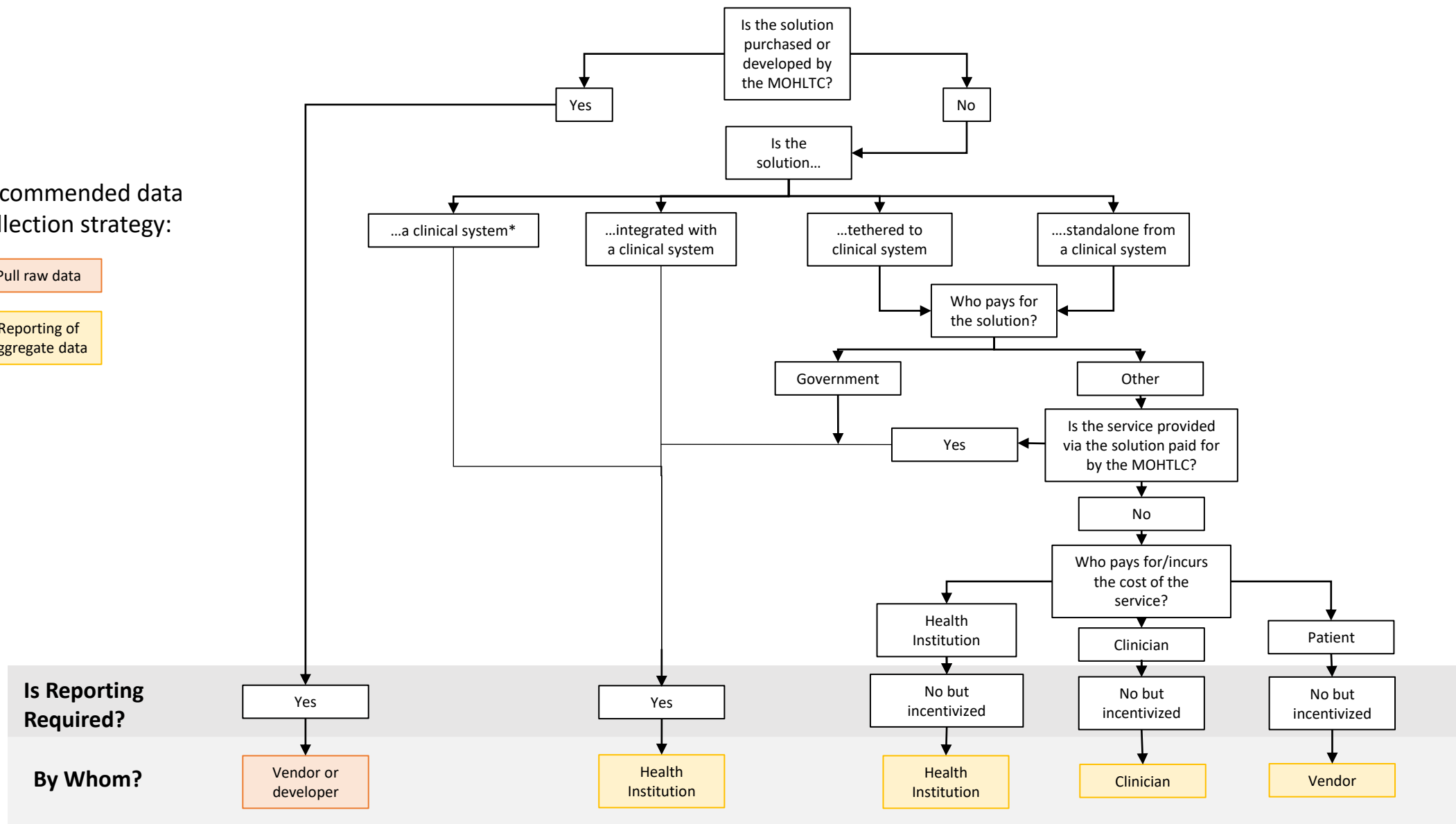
## **What is the type of technology?**

See NHS Evidence Standards Framework for Digital Health Technologies classification of digital health tools as a consideration for how to classify evidence requirements (Appendix 2)

# Flowchart: Should a DHT be monitored by the MOHLTC?

Recommended data collection strategy:

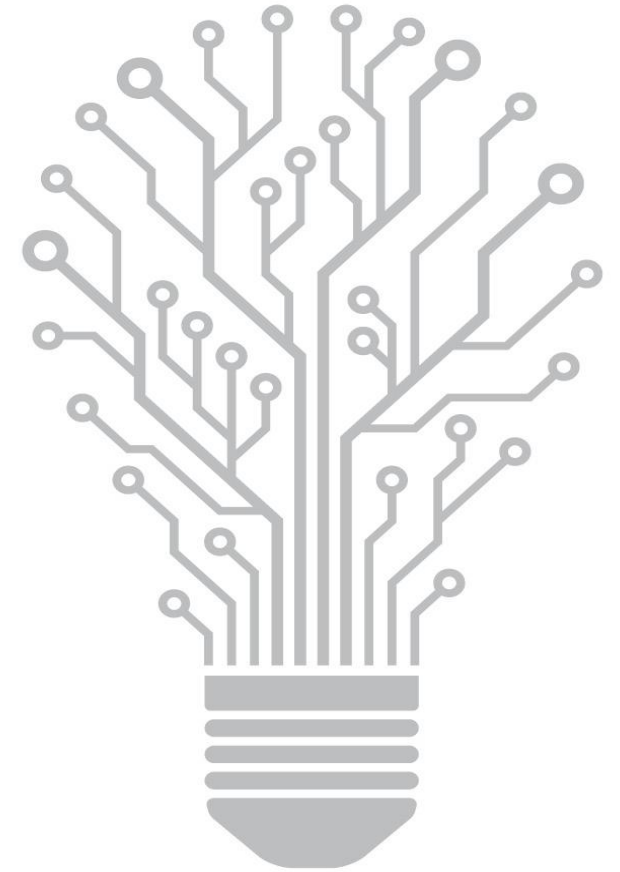
- Pull raw data
- Reporting of aggregate data



Is Reporting Required?	By Whom?
Yes	Vendor or developer
Yes	Health Institution
No but incentivized	Health Institution
No but incentivized	Clinician
No but incentivized	Vendor

Declining feasibility of obtaining data for monitoring

## Part 4. Data collection strategies and considerations



## Consider the type of health institution from which you intend to collect data

- It will be much harder to incentivize smaller primary care or specialist clinics with whom you have no pre-existing relationship, and data will have to be collected from numerous organizations
- Health institutions with which you have pre-existing relationships (e.g. hospitals) will be easier to incentivize to report

## **The greater the number of vendor solutions, the more difficult it is to collect data directly**

For digital health solutions that have a free market or multiple vendors, data collection becomes more difficult due to a lack of standardized data formats and structures between vendors

Further, if these solutions are purchased by an organization or clinic without payment from the MOHTLC, feasibility further declines

# Data Collection – Mechanisms

Are you pulling data or do you require reporting to be generated by the institution/vendor?

Data pull (raw data)	
Benefits	Challenges/Risks
<ul style="list-style-type: none"> <li>• Potential linkage between data sources</li> <li>• More data</li> <li>• Not altered</li> <li>• Real-time</li> <li>• Can manipulate and analyze data</li> <li>• Can define thresholds, structures, definitions, and labelling the way you want</li> </ul>	<ul style="list-style-type: none"> <li>• Storage demands</li> <li>• Requires widespread adoption of APIs</li> <li>• Data is not “cleaned”; requires resources to fix it</li> <li>• Data/privacy concerns</li> </ul>
Incentivized reporting (aggregate data)	
Benefits	Challenges/Risks
<ul style="list-style-type: none"> <li>• Sender would “clean” it</li> <li>• No widespread IT adoption required</li> <li>• Low resource requirements</li> <li>• Solution-specific expertise in interpreting data</li> <li>• Accessible and scaleable</li> </ul>	<ul style="list-style-type: none"> <li>• Potential data gaps</li> <li>• Need strong incentive scheme with supporting bureaucracy</li> <li>• Sender may not have resources to clean well</li> <li>• Delays in receiving data</li> <li>• Data is skewed</li> <li>• Can't manipulate data</li> </ul>

# Data sources - Feasibility

Data Source	Feasibility	Factors influencing success	Limitations	Recommendations
<b>Administrative claims data (e.g. ICES, CIHI, HAB)</b>	High (the MOHLTC has access to this data)	Capacity/ resourcing in the MOHTLC → Requires resources and working with researchers  Billing code that differentiates eVisits	Cannot capture visits that providers do not bill  Cannot capture visits from non-billing providers (e.g. nurse practitioners)  May require data linkage	Acknowledge limitations of this data source; best option for linking to system usage outcomes  Need mechanism to identify digital health users in database (e.g. OHIP #)
<b>Aggregate data (standardized reporting) from health institution</b>	Medium (depends on size of clinic) Easier if solution integrated across the institution; challenging if at program or clinician level	Completion rate  Legislation/ impact of completion on funding	Data is self-reported which is not always accurate	Mandate/ incentivize clinician reporting  Consider methods to automate reporting

# Data sources - Feasibility

Data source	Feasibility	Factors influencing success	Limitations	Recommendations
<b>Vendor data (raw data)</b>	Dependent on whether solution was developed or purchased by the MOHLTC	Whether vendor is willing to provide data Can be mandated if purchased or developed by the MOHLTC	Data format will not be consistent if multiple vendors Requires interpretation and analyses	Only pull raw data from MOHLTC-owned technology
<b>Vendor data (aggregate data)</b>	Medium (dependent on vendor engagement)	Whether vendor is willing to provide reporting data	Data format will not be consistent across vendors	Mandate reporting from vendors in consistent format to be eligible for funding
<b>Survey to patients via vendor solution</b>	High (if asked after every visit, likely large sample size)	Whether vendor is willing to include survey and share results	Sample bias of those willing to respond  Survey fatigue	Mandate inclusion of survey in vendor solution to be "certified" for funding



**The easiest way to report on usage is through dedicated fee codes associated with a virtual visit or consultation**

However, you will miss usage conducted by salaried providers (e.g. nurse practitioners and nurses)

## Reporting on data collected in digital solutions is resource-intensive

- Reporting is a secondary function of digital health solutions, and unless incentivized is not built into the tools
- Thus, data has to be cleaned, which can either be built into the technology (see HITECH Meaningful Use, where incentives on reporting led to development of reporting functionality in EMRs in the U.S.) or manipulated manually
- Majority of reporting would have to be done manually by the organization responsible (e.g. health institution)
  - This requires dedicated resources

**It will take significant time and resources for organizations to learn how to report on desired metrics and to carry out reporting**

## It will be very difficult to collect reporting data without clear incentives or mandates

- As noted, reporting on data is resource-intensive and costly
- It is easier to effectively mandate reporting from technologies controlled by the MOHLTC
  - There are several potential implications of mandating reporting from health institutions; e.g., it will be more difficult for smaller institutions and those with fewer resources
- Incentives can be leveraged to rationalize a marketplace and facilitate certain types of activity
  - E.g. U.S. certification rules requiring API-based interoperability ([21<sup>st</sup> Century Cures Act](#)) incentivizes vendors to use standardized data formats

## Consider an incentive program that becomes a effective mandate over time

- See learnings from HITECH Meaningful Use; major complaint was the short timeline to meet adoption and reporting requirements

## HITECH “Meaningful use” Initiative

**Overview of initiative** ([Blumenthal & Tavenner, 2010](#), [Slight et al., 2015](#), [Halamka & Tripathi, 2017](#))

- \$30 billion incentives; reporting expectations evolved quickly
- High incentives to encourage adoption of electronic health records and their use to improve quality and efficiency in the health system
- Required reporting of aggregate data on highly specific list of performance metrics linked to funding incentives for first two years of the program

**Impact on outcomes** ([Jones et al., 2014](#), [Adler-Milstein & Jha, 2017](#))

- Successful in stimulating adoption
- Impact on efficiency, quality, and safety unclear but some positive findings

## HITECH “Meaningful use” Initiative

### Challenges with provider and administrative experience

- Perceived as too rigid by some, and as stifling innovation ([Slight et al., 2015](#))
- Demands were too high and fast for clinicians and administrators, leading to challenges in workflow, usability, innovation, interoperability, and patient engagement.
  - “Along the way, however, we lost the hearts and minds of clinicians. We overwhelmed them with confusing layers of regulations. We tried to drive cultural change with legislation. We expected interoperability without first building the enabling tools. In a sense, we gave clinicians suboptimal cars, didn’t build roads, and then blamed them for not driving” ([Halamka & Tripathi, 2017](#))
  - “Soon physicians were expected to provide high-quality and empathic care in a 12-minute visit while weaning themselves from paper based workflows, entering the numerous structured data elements required for meaningful use, rolling out new HIPAA privacy notices, implementing security protections for new electronic data, learning and incorporating new ICD-10 billing codes, and convincing their patients to use patient portals and secure e-mail, all while avoiding safety and malpractice issues.” ([Halamka & Tripathi, 2017](#))

## Accountable Care Organizations (ACOs)

([Peckham et al., 2018](#), [Schulz et al., 2015](#), [MedeAnalytics, 2011](#))

- Reporting infrastructure is a cornerstone of effective ACOs
- ACOs mandate reporting by tying payment to performance
- Evidence of the impact of ACOs on system utilization, quality, and patient outcomes are mixed; generally cost-saving

**We advise looking into the methods they have employed to ensure that institutions provide consistent, high quality data on relevant performance metrics**

To enable performance assessment relative to expectations, it is essential that:

- **Value for money is clearly defined in the solution contract; and**
- **Target metrics are determined on a per-solution basis.**

Given the diversity of digital solutions available, benchmarking performance between them becomes challenging to do credibly, as value and cost are defined uniquely in each solution.

In general, approaching benchmarking from an HTA lens by:

- **Collecting data and analyzing cost-effectiveness relative to baseline (no intervention);**
- **Thinking about what unit of measurement matters so you can compare value for money across investments (e.g. Quality-adjusted life years); and**
- **Developing thresholds for cost-effectiveness over time.**

# Data Interoperability – International Examples

## Manchester Health Corridor

- Creating Interoperability Hub to connect all systems within their region so they can exchange data without having to change local system; Central IT governance
- Creating Innovation Hub to enhance how they use data for research and innovation

## HITECH “Meaningful Use”

- Interoperability was a requirement, but was left vague how it would occur; relied on local solutions and the free market to fix this issues
- Issues arose such as “information blocking”, where EHRs stopped sharing information because they realized the information they held was valuable and created a barrier to switching to alternative systems ([Adler-Milstein & Pfeifer, 2017](#))
- Unspecified funding models for independent agencies to collaborate around health information exchange were unsuccessful

## 21<sup>st</sup> century cures act

- The US Office of the National Coordinator (ONC) has been suggesting new rules to improve the ability for healthcare technologies to share data via standardized application programming interfaces (APIs) and greater ability for patients to access their full records in a calculable electronic format.

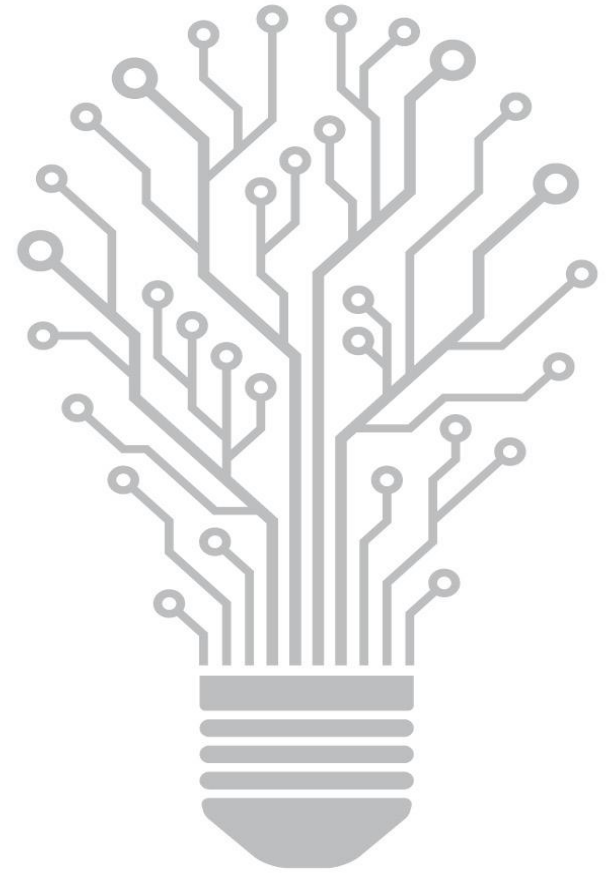


Will you certify solutions that are eligible for public funding/ billing?

- Consider the [NICE framework](#) as a mechanism to classify certification type and requirements for solutions that will receive public funding
- This could be used as a mechanism to obtain reporting directly from these vendors if you restrict billing or use by certification

Benefits	Challenges/Risks
<ul style="list-style-type: none"><li>• Ensures solutions are safe</li><li>• Comparability of performance across solutions</li><li>• Promotes ability to mandate reporting directly from vendor</li><li>• Promotes ability to mandate data standards across vendors</li></ul>	<ul style="list-style-type: none"><li>• Limits free market which promotes innovation</li><li>• Resource burden in certification</li><li>• Ontario is a small global market, so may dis-incentivize vendors from entering into Ontario</li></ul>

## Part 5. Examples



# Example 1: Virtual Primary Care

Consider a situation where virtual visits for primary care are funded by the MOHLTC (as in the OTN-led Enhanced Access to Primary Care demonstration project)

**Technology:** Multiple vendors that have been procured by OTN

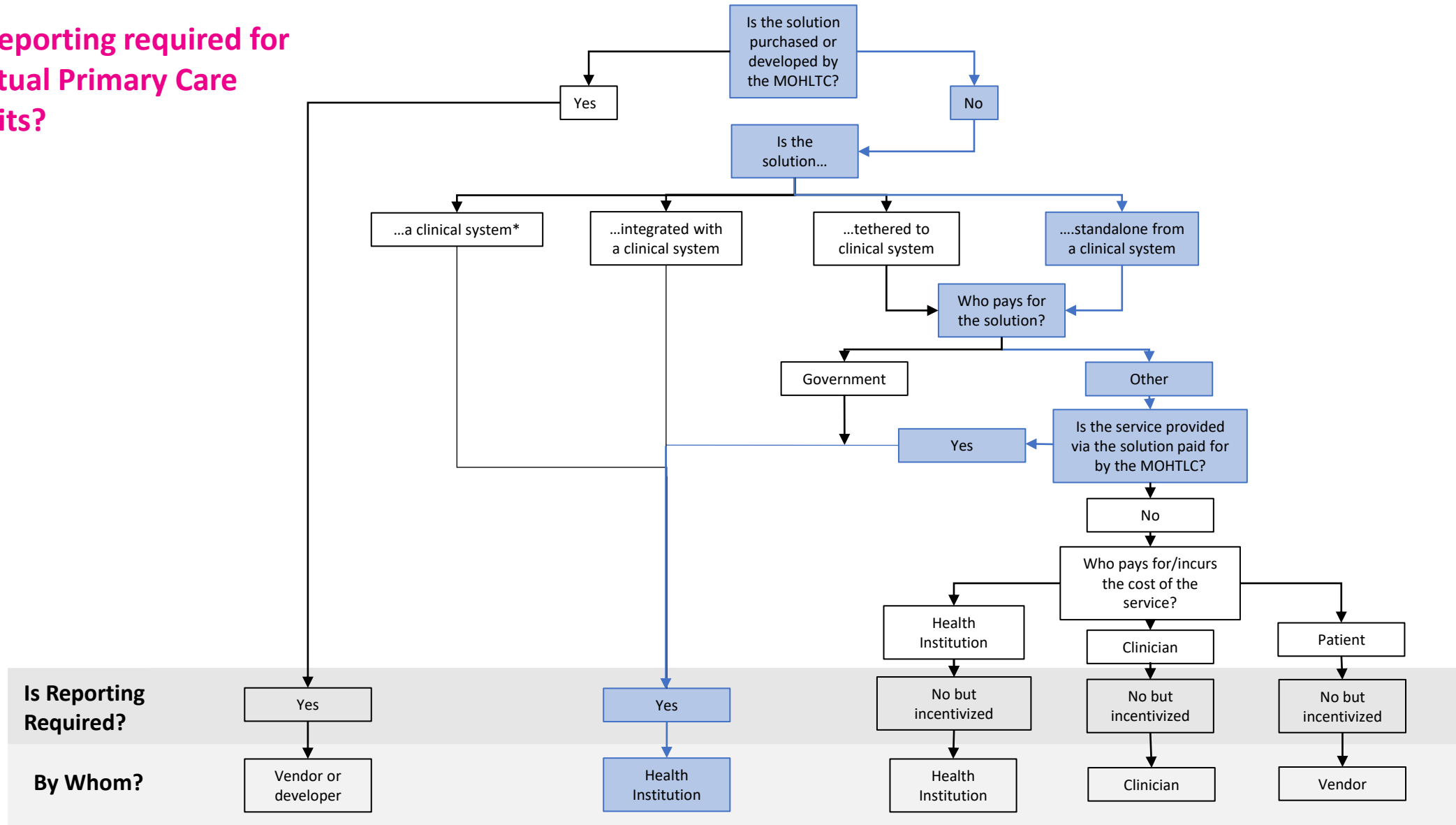
**Implementation:** LHIN chooses preferred technology to be implemented across primary care clinics in their region

**Data Collection: Monitoring & reporting stage**

Research, validation, and evaluation complete.

# Example 1: Virtual Primary Care

Is reporting required for Virtual Primary Care Visits?



Declining feasibility of obtaining data for monitoring

# Example 1: Virtual Primary Care

## How could we monitor its value?

	<b>Quadruple Aim</b>				<b>Safety and Risk</b>
Reporting domains	Patient Outcomes	Patient Experience	Provider Experience	Efficiency	
Data Collection Process	<p><b>How:</b> ICES data analysis -Identify patients through eVisit billing</p> <p><b>What:</b> -Health system utilization -Equity: geographic, socioeconomic, and racial distribution of patients</p> <p><b>When:</b> Annually</p>	<p><b>How:</b> Survey built into vendor solution</p> <p><b>What:</b> -Satisfaction with visit -Ease of use -Willingness to recommend -Comparison to in-person (quality, time, and cost)</p> <p><b>When:</b> After every visit</p>	<p><b>How:</b> Clinic reporting form</p> <p><b>What:</b> -Satisfaction with solution -Ease of use -Willingness to recommend -Workflow impact</p> <p><b>When:</b> Annually</p>	<p><b>How:</b> 1) Aggregate data from vendors 2) Clinic reporting form</p> <p><b>What:</b> 1) Returning, new, and active users 2) Training, time spent/ saved, budget impact</p> <p><b>When:</b> Annually</p>	<p><b>How:</b> Clinic reporting form</p> <p><b>What:</b> -Adverse events associated with the technology -Technological errors -Privacy, security, confidentiality practices/ breaches</p> <p><b>When:</b> Annually</p>

## Example 2: Online scheduling of appointments

Consider clinics that allow online scheduling of appointments either directly through their EMR or a separate, online platform (e.g. a website) that integrates with their EMR.

**Technology:** Variable; no standard technology or procurement by the MOHLTC.

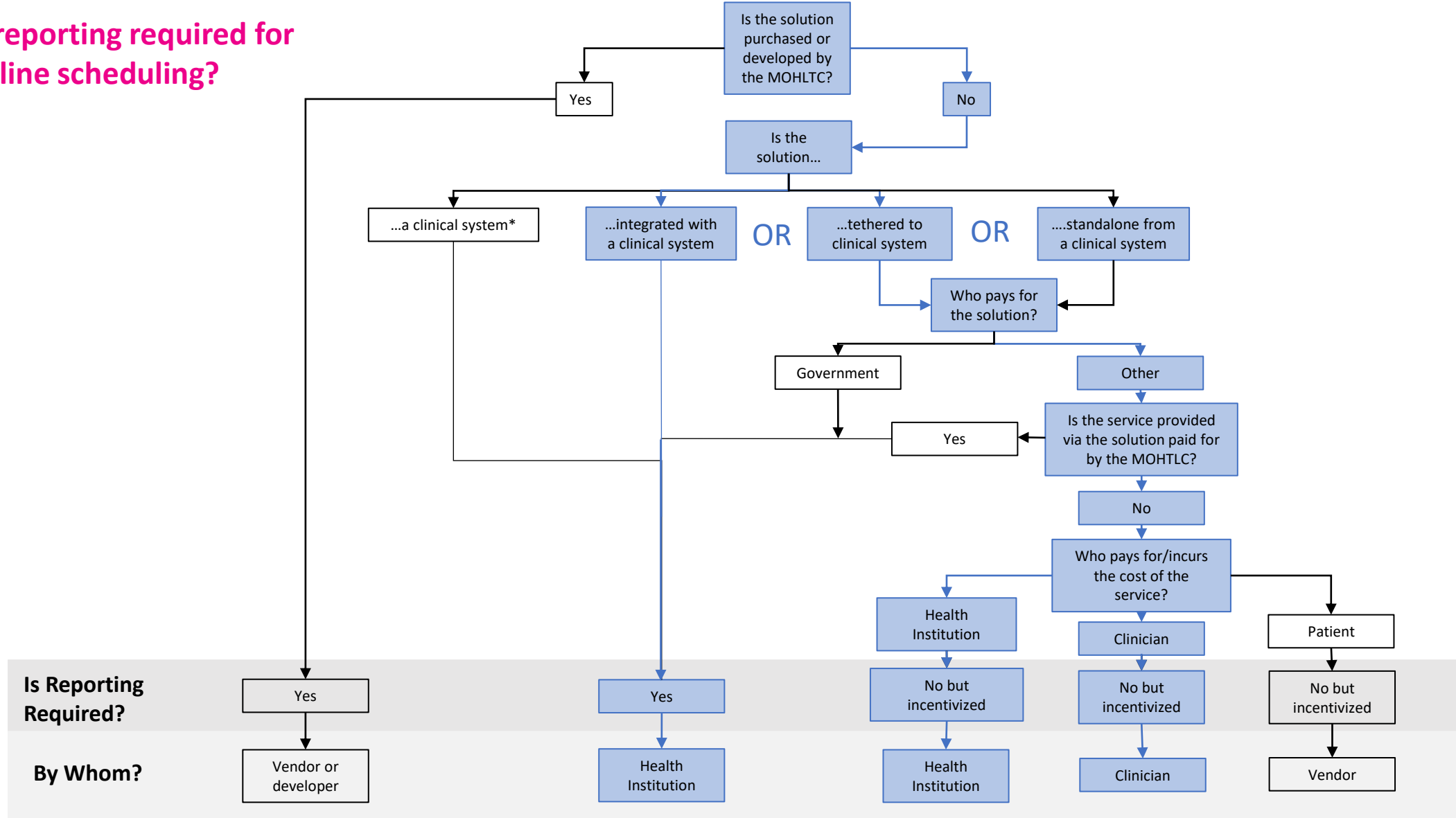
**Implementation:** Varies per clinic/ institution.

**Data Collection: Monitoring & reporting stage**

Research, validation, and evaluation infeasible because various technologies implemented and no purchasing role of the MOHLTC.

# Example 2: Online scheduling of appointments

Is reporting required for online scheduling?



Declining feasibility of obtaining data for monitoring

# Example 2: Online scheduling of appointments

## How could we monitor its value?

	<b>Quadruple Aim</b>				<b>Safety and Risk</b>
Reporting domains	Patient Outcomes	Patient Experience	Provider Experience	Efficiency	
Data Collection Process	N/A	<p><b>How:</b> Survey built into solution</p> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Ease of use</li> <li>-Willingness to recommend</li> <li>-Satisfaction / convenience</li> </ul> <p><b>When:</b> After each use</p>	<p><b>How:</b> Clinic reporting form</p> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Satisfaction with solution</li> <li>-Ease of use</li> <li>-Willingness to recommend</li> <li>-Workflow impact</li> </ul> <p><b>When:</b> Annually</p>	<p><b>How:</b></p> <ol style="list-style-type: none"> <li>1) Aggregate data from vendors</li> <li>2) Clinic reporting form</li> </ol> <p><b>What:</b></p> <ol style="list-style-type: none"> <li>1) Number of appointments booked</li> <li>2) Type of appointments booked</li> <li>3) Cost of service to organization</li> </ol> <p><b>When:</b> Annually</p>	<p><b>How:</b> Clinic reporting form</p> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Privacy, security, confidentiality practices/ breaches</li> </ul> <p><b>When:</b> Annually</p>



# Example 3: eConsults

eConsults are a mechanism to enable rapid access for providers to specialist opinions on patient care or test results.

**Technology:** eConsults are available through an OTN platform with dedicated billing, or via third party solutions such as Novari Health.

**Implementation:** Primary care providers (PCPs) identify the required specialist area; eConsult Centre of Excellence (or vendor) sends to specialist; specialist reviews the information provided by the PCP and articulates responses at time that is convenient for them. 24-48 hour turnaround.

**Data Collection: Monitoring & reporting stage**

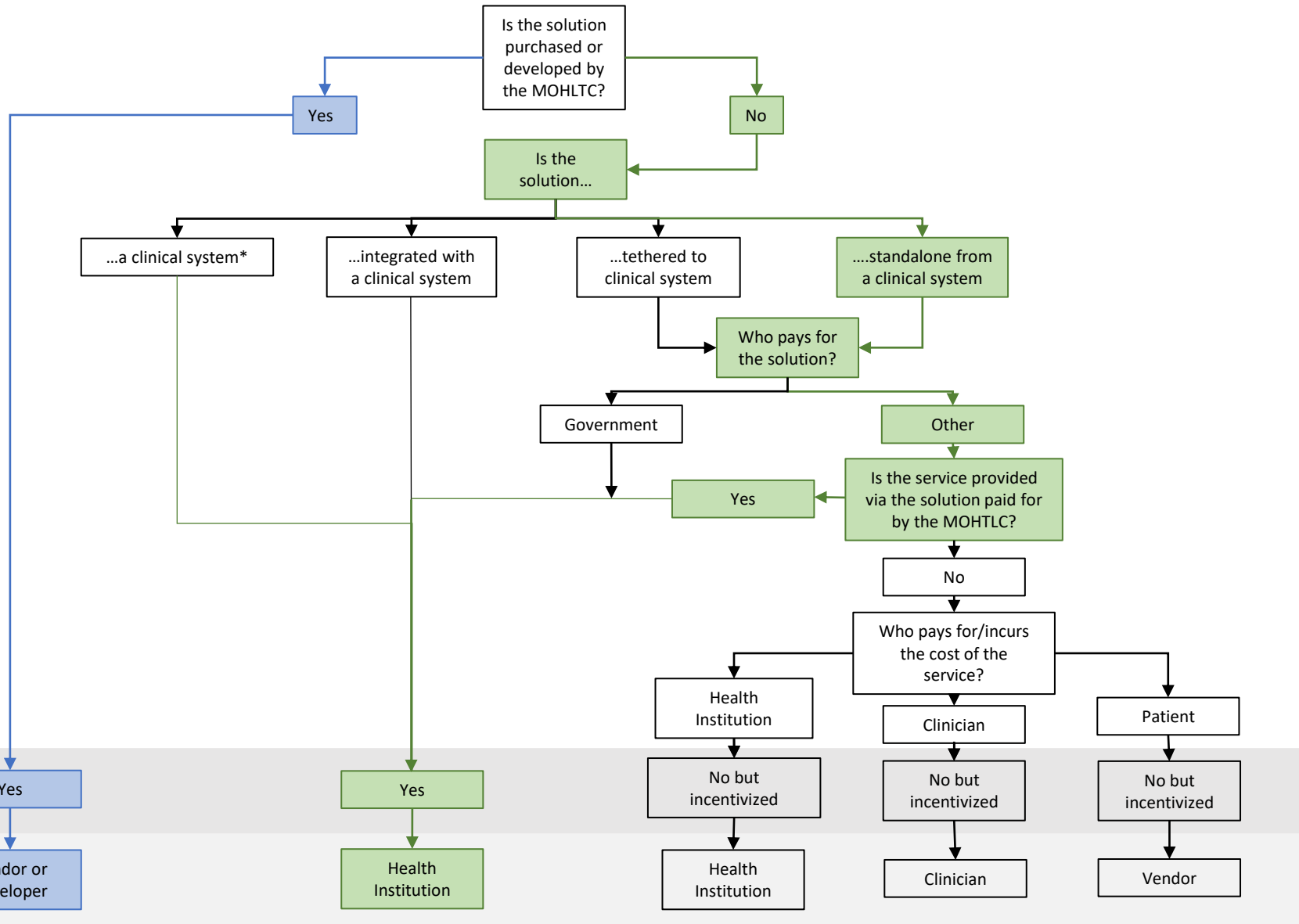
# Example 3: eConsults

Is reporting required for eConsults?

OTN eConsults

Non-OTN eConsults

Difficult to identify who is using non-OTN eConsults without going to the vendors, who may not be able to / want to release their vendors. Likely a large amount of effort for a small proportion of eConsults in the province.



Is Reporting Required?

Yes

Yes

No but incentivized

No but incentivized

No but incentivized

By Whom?

Vendor or developer

Health Institution

Health Institution

Clinician

Vendor

Declining feasibility of obtaining data for monitoring

# Example 3: OTN eConsults

## How could we monitor its value?

	<b>Quadruple Aim</b>				<b>Safety and Risk</b>
Reporting domains	Patient Outcomes	Patient Experience	Provider Experience	Efficiency	
Data Collection Process	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>-Primary care provider survey</li> <li>-Incorporate question(s) after each consult</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Impact on in-person specialist visit</li> <li>-Impact on quality of care</li> <li>-Impact on care decision</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-After each consult</li> </ul>	N/A	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>-Primary care provider survey</li> <li>-Send out via the OTN platform</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Impact on provider care provision</li> <li>-Satisfaction with solution</li> <li>-Impact on likelihood to seek specialist consultation</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-Annually</li> </ul>	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>Direct data pull from OTN solution</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Number of uses per PCP, per specialist</li> <li>-Resolution time (provider-indicated)</li> <li>-Remuneration</li> <li>-Establishing/maintenance costs</li> <li>-Provider location</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-Annually</li> </ul>	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>-Specialist survey</li> <li>-Send out via the OTN platform</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Comfort providing consult over eConsult platform</li> <li>-Perceived risks</li> <li>-Perceived benefit on safety</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-Annually</li> </ul>

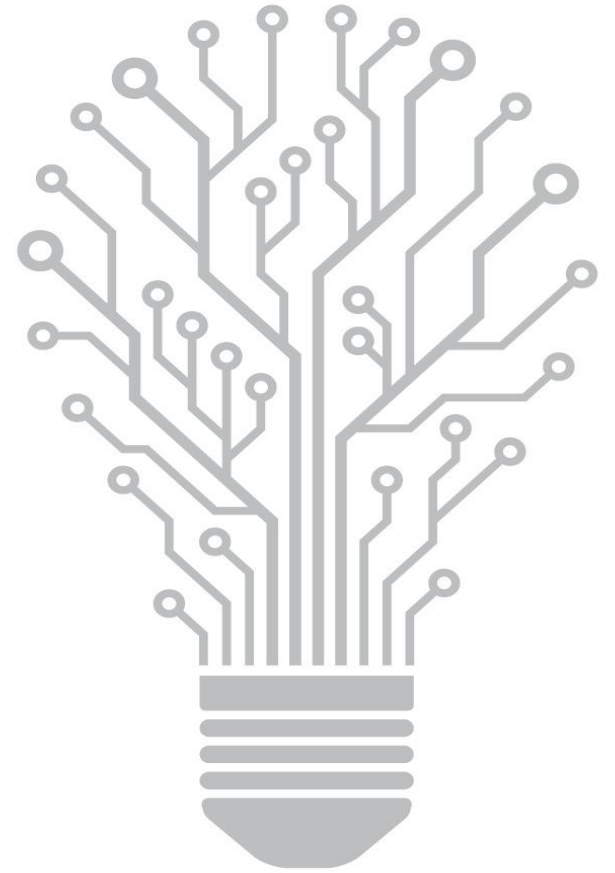
# Example 3: Non-OTN eConsults

## How could we monitor its value?

Reporting domains	<b>Quadruple Aim</b>				<b>Safety and Risk</b>
	Patient Outcomes	Patient Experience	Provider Experience	Efficiency	
Data Collection Process	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>-Primary care provider survey*</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Impact on in-person specialist visit</li> <li>-Impact on quality of care</li> <li>-Impact on care decision</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-After each consult</li> </ul>	N/A	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>-Primary care provider survey*</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Impact on provider care provision</li> <li>-Satisfaction with solution</li> <li>-Impact on likelihood to seek specialist consultation</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-Annually</li> </ul>	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>-Aggregate data from vendors</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Number of uses per PCP, per specialist</li> <li>-Resolution time (provider-indicated)</li> <li>-Remuneration</li> <li>-Establishing/maintenance costs</li> <li>-Provider location</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-Annually</li> </ul>	<p><b>How:</b></p> <ul style="list-style-type: none"> <li>-Specialist survey*</li> </ul> <p><b>What:</b></p> <ul style="list-style-type: none"> <li>-Comfort providing consult over eConsult platform</li> <li>-Perceived risks</li> <li>-Perceived benefit on safety</li> </ul> <p><b>When:</b></p> <ul style="list-style-type: none"> <li>-Annually</li> </ul>

\*Challenge: distribution

## Part 6. Additional materials



# References

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- Slight, P.S. et al. 2015. [Meaningful Use of Electronic Health Records: Experiences From the Field and Future Opportunities](#). *JMIR Medical Informatics* 3(3):e30.
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- After a thorough search of existing resources on dictionaries for health information technology (IT) and digital health terminology, we have identified the:

**[HIMSS Dictionary of Health Information and  
Technology Terms, Acronyms and Organizations](#)**

as the best source. This dictionary contains extensive definitions that are literature-informed and validated. It is in its fifth edition, and is produced by the Healthcare Information & Management Systems Society (HIMSS).

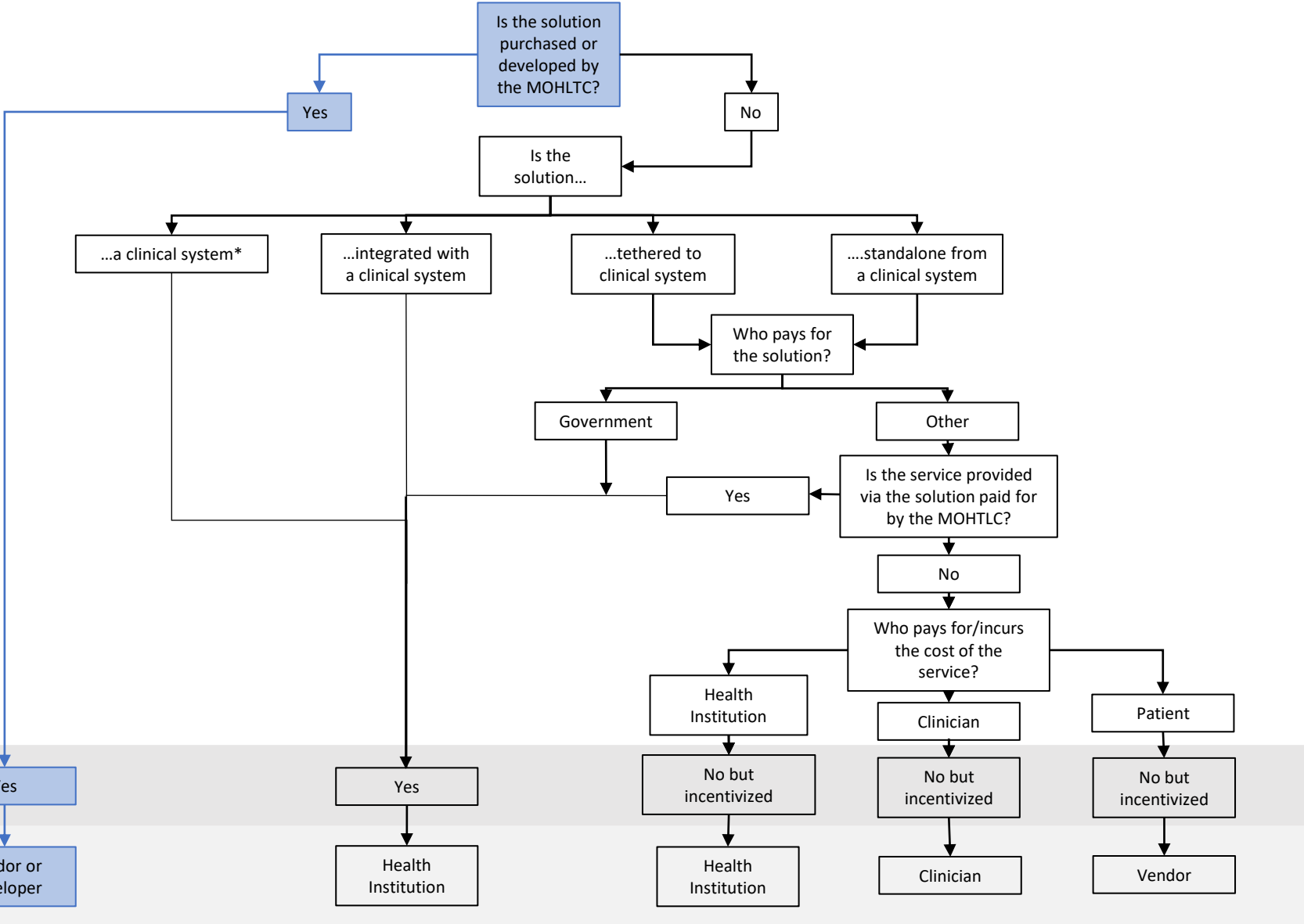
→ HIMSS is a global leader in healthcare IT, with over 72,000 individual members and 630 corporate members. Hospitals around the world use their IT standards and educational resources, including the Toronto TAHSN hospitals.

- We have pulled out key definitions from this dictionary that pertain to digital health implementation and evaluation.
- Further we have supplemented this with definitions of classifying digital devices (see attached documents).



# Appendix 1. Is Reporting Required?

DHDR  
DICS  
ClinicalConnect  
ConnectingOntario  
OTN Technologies

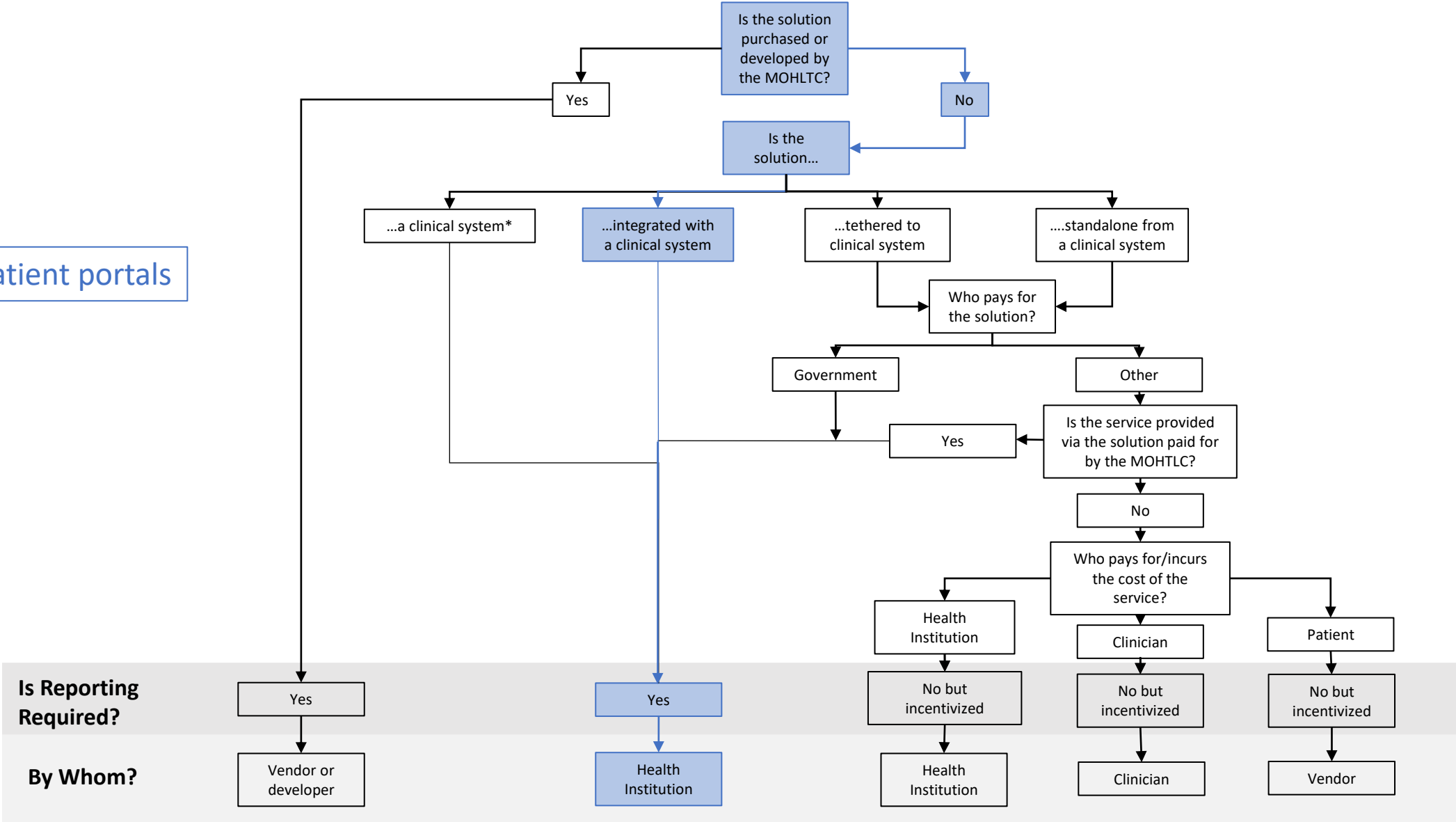


<b>Is Reporting Required?</b>	Yes	Yes	No but incentivized	No but incentivized	No but incentivized
<b>By Whom?</b>	Vendor or developer	Health Institution	Health Institution	Clinician	Vendor

Declining feasibility of obtaining data for monitoring ➔

# Appendix 1. Is Reporting Required?

Patient portals

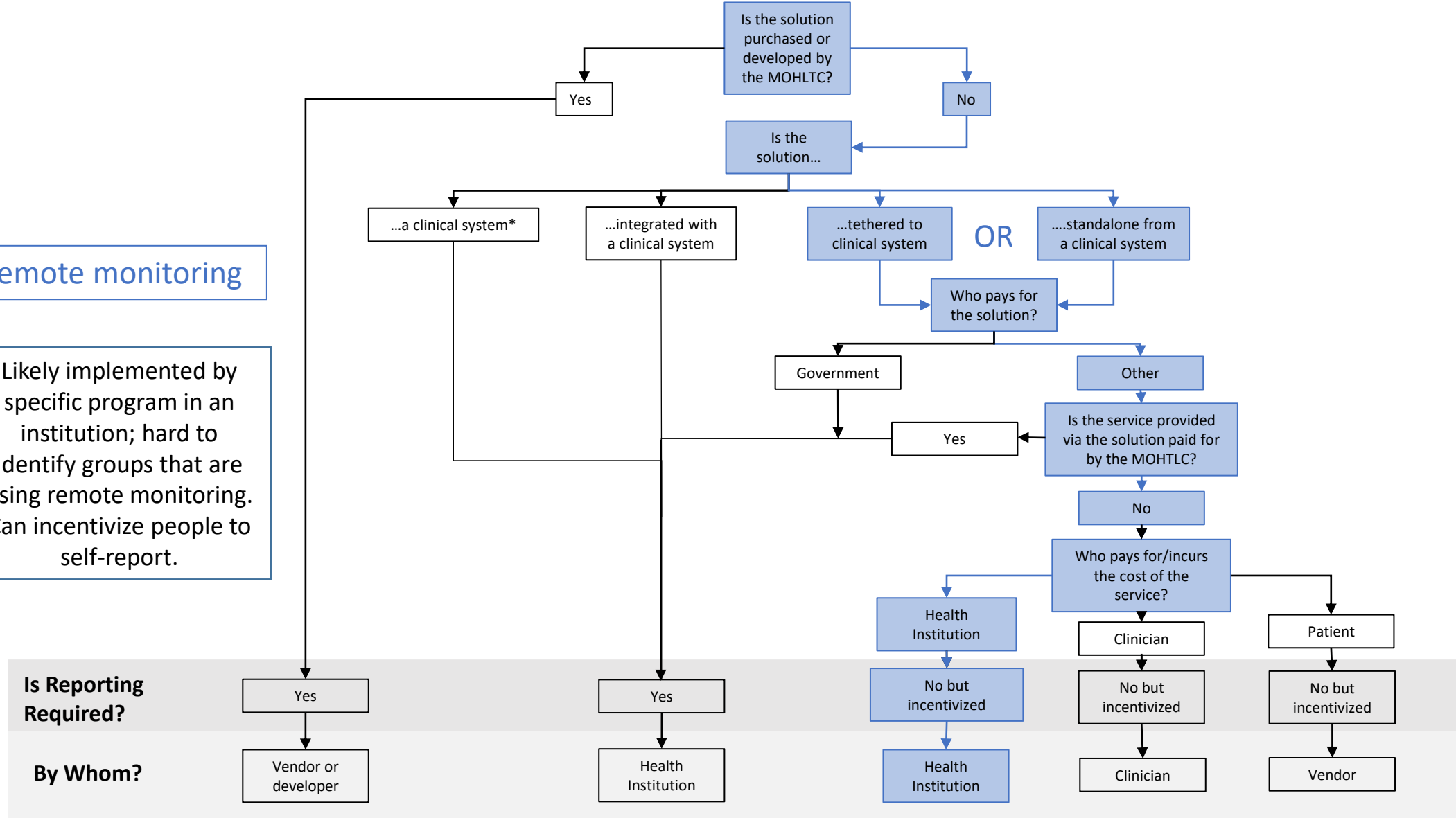


Declining feasibility of obtaining data for monitoring

# Appendix 1. Is Reporting Required?

Remote monitoring

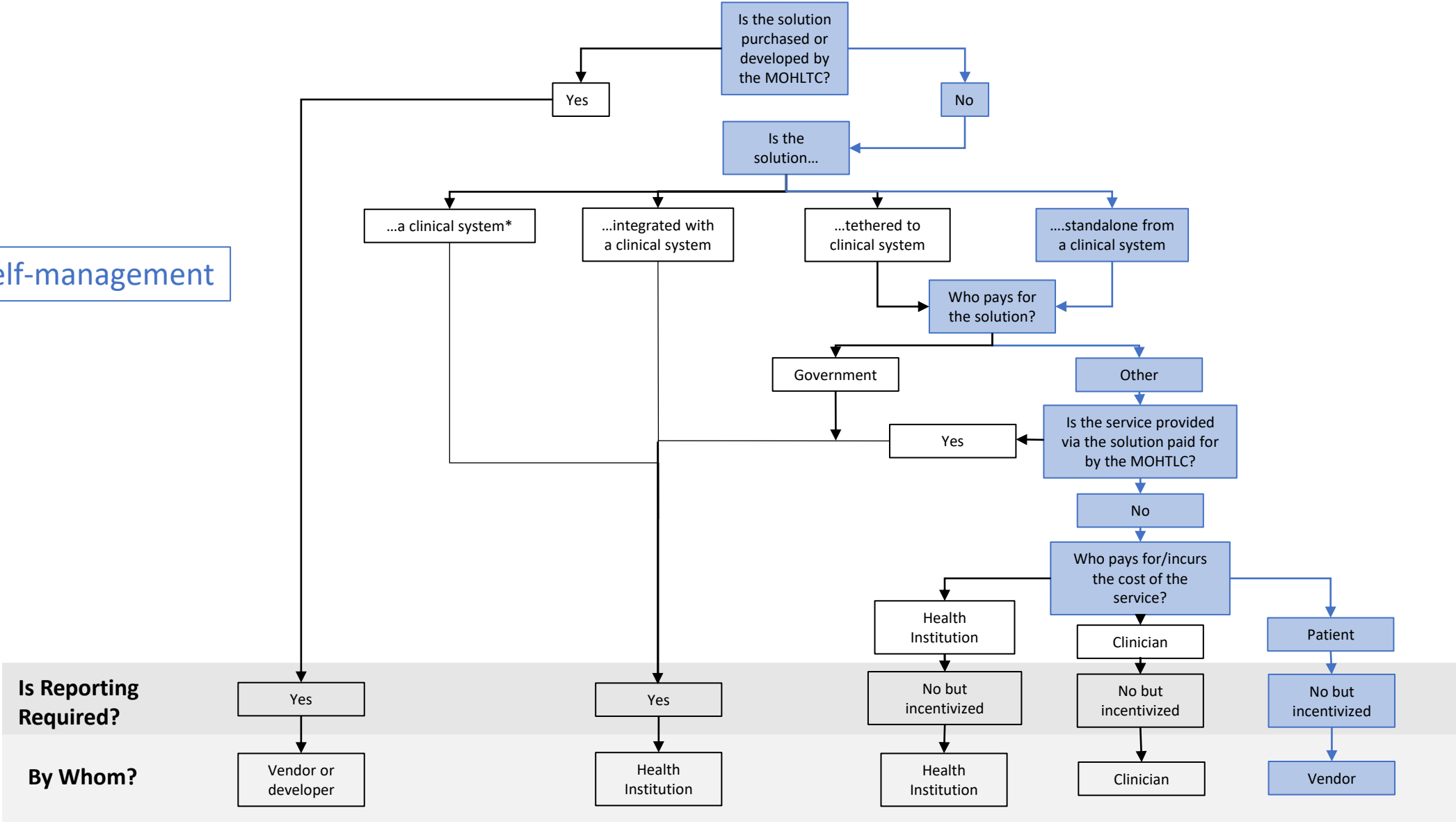
Likely implemented by specific program in an institution; hard to identify groups that are using remote monitoring. Can incentivize people to self-report.



Declining feasibility of obtaining data for monitoring

# Appendix 1. Is Reporting Required?

Self-management

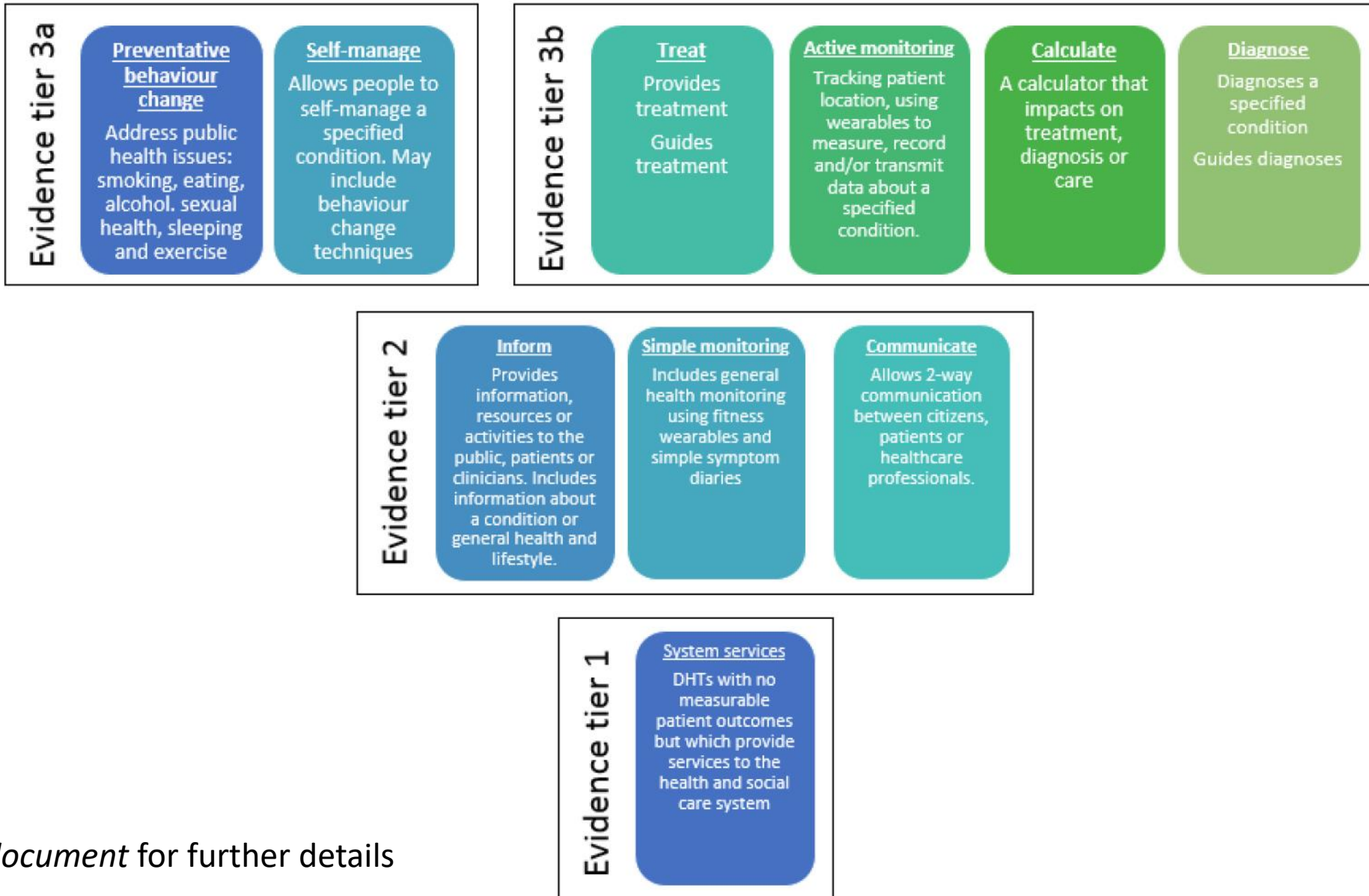


Is Reporting Required?

By Whom?

Declining feasibility of obtaining data for monitoring

# Appendix 2: NICE classification of DHTs



See Appendix 2 document for further details