



MACHINE LEARNING CDS TOOL FOR MAID ELIGIBILITY

Aisha Ali, Hamna Ansar, Saliha Safi, Kevin Pham, Sabrina Yu

February 22, 2024

This the Agenda

01

Introduction

02

Current State

03

Business Case

04

Future State

05

Stakeholder
Engagement

06

Conclusion



Introduction

- MAiD, or medical assistance in dying is a legal practice that enables eligible patients to terminate their lives through euthanasia
 - Provided only to patient who satisfy eligibility requirements
 - Strict compliance to legal and ethical guidelines
- Report conducted on MAiD in Canada revealed there were 13,241 MAiD provision reports in 2022, accounting for **4.1% of deaths** (Government of Canada, 2023)
 - Primary factors for MAiD requests
 - **loss of autonomy (86.3%)**

A difficult decision must be made.






CURRENT STATE ANALYSIS

- Canadian government has established criteria for MAID
- To determine whether the patient is eligible in accordance with all criteria, **two clinicians** (physician or a nurse practitioner) are **required** (Health Canada, 2023).
- **Limitations** on the **expertise** and **education** of practitioners
 - Numerous individuals fall through the cracks
 - Falsely classified as eligible or ineligible
- The procedure may be time-consuming
- **Lacks a patient-centric** strategy
- Emotional triggers in MAID practise
 - Regarding eligibility, there is **ambiguity** or **uncertainty** (Health Canada, 2023).

Ontario


Ministry of Health

Clinician Aid B
(Primary) "Medical Practitioner" or "Nurse Practitioner" Medical Assistance in Dying Aid

Medical Assistance in Dying means:

(a) the administering by a medical practitioner or nurse practitioner of a substance to a person, at their request, that causes their death;

or

(b) the prescribing or providing by a medical practitioner or nurse practitioner of a substance to a person, at their request, so that they may self-administer the substance and in doing so cause their own death.

Medical practitioner means a person who is entitled to practise medicine under the laws of the province of Ontario.

Nurse practitioner means a registered nurse in the extended class who, under the laws of the province of Ontario is entitled to:

- 1) practise as a nurse practitioner – or under an equivalent designation; and
- 2) autonomously make diagnoses, order and interpret diagnostic tests, prescribe substances and treat patients.

A person is considered to have a **grievous and irremediable** medical condition where:

- they have a serious and incurable illness, disease or disability;
- they are in an advanced state of irreversible decline in capability; and,
- that illness, disease, or disability or that state of decline causes them enduring physical or psychological suffering, that is intolerable to them and that cannot be relieved under conditions that they consider acceptable.

Note: Persons whose sole underlying medical condition is a mental illness, and who otherwise meet all eligibility criteria, are not currently eligible for MAID.

The term mental illness does not include neurocognitive or neurodevelopmental disorders, or other conditions that may affect cognitive abilities.

The use of this aid is voluntary. It is being provided to assist you in maintaining records of requests for medical assistance in dying. Please use this aid if you are a "Medical Practitioner" or "Nurse Practitioner" and a patient is requesting medical assistance in dying and it is your intention to provide medical assistance in dying to the patient. If you are a "preliminary assessor", you can use this aid to provide information about a determination of ineligibility for a person who has made a request for MAID.

For more information related to your professional obligations with respect to medical assistance in dying, please refer to any guidance and/or policies on medical assistance in dying issued by your regulatory college.

Section 1 – Patient Information

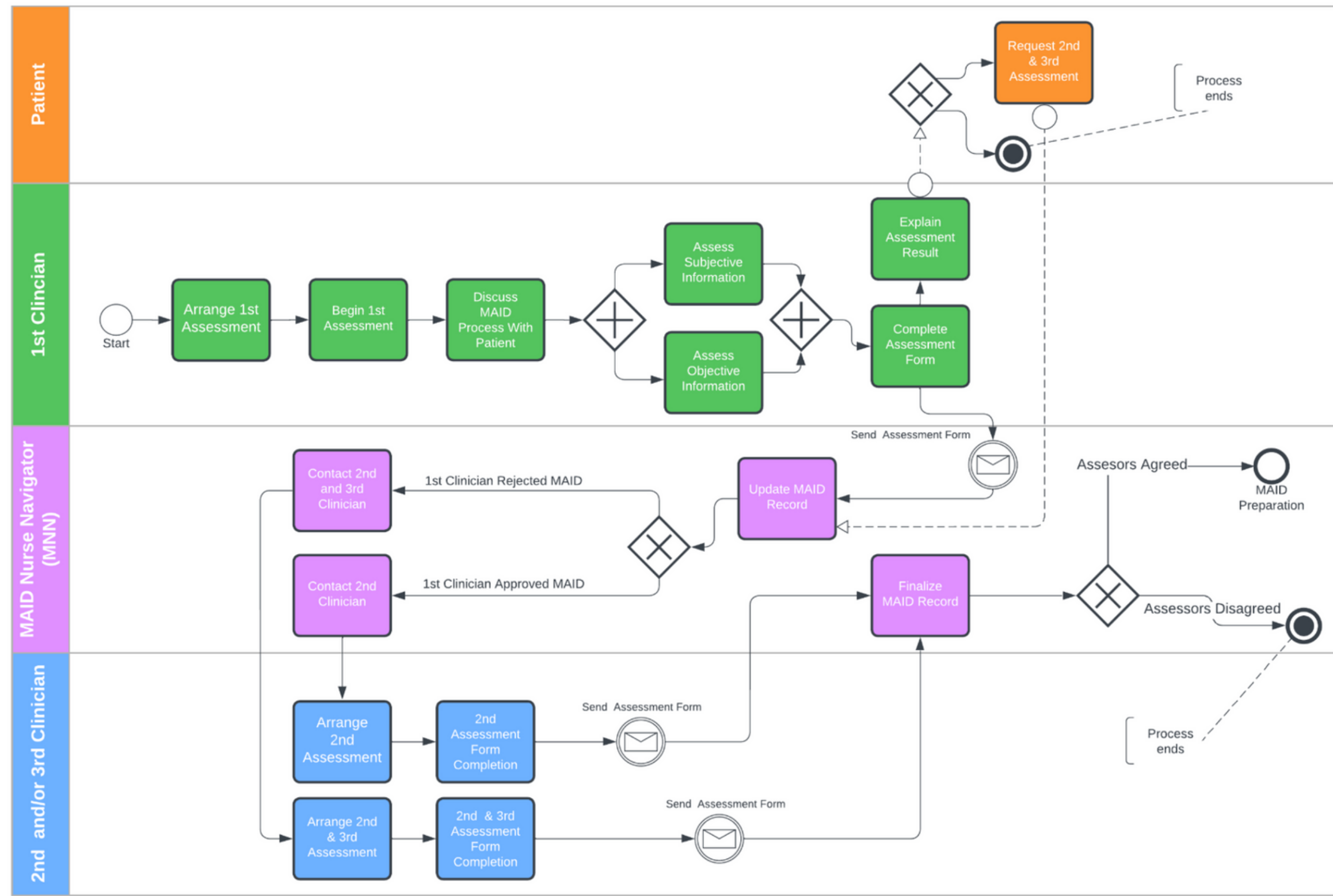
Last Name		First Name	
Sex at Birth		<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Person did not consent to provide the information <input type="checkbox"/> Other (e.g., intersex) (specify) ►	
Gender		<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Person did not consent to provide the information <input type="checkbox"/> Other (e.g., intersex) (specify) ►	
Date of Birth (yyyy/mm/dd)	Health Insurance Number (e.g., OHIP Number)		Version Code
	<input type="checkbox"/> Not Applicable		
Province or Territory that Issued Health Insurance Number		Postal Code Associated with Patient's Home Address	
		<input type="checkbox"/> Patient does not have a home address	
Person identifies as:			
<input type="checkbox"/> First Nations <input type="checkbox"/> Métis <input type="checkbox"/> Inuk/Inuit <input type="checkbox"/> None of the above <input type="checkbox"/> Person does not know <input type="checkbox"/> Person did not consent to provide the information			

3890-22E (2023/01) © King's Printer for Ontario, 2023

Disponible en français

Page 1 of 13

Level 3 As-is Current State Process BPMN For Conduction of MAID Assessments by Clinicians





BUSINESS CASE

From Reactive to Proactive:

To **support the assessment of a patient's eligibility** for MAID in an inpatient environment

Utilize both qualitative and quantitative data from a patient's Electronic Health Record (EHR) to expedite the process and enable accurate evaluations

Inform stakeholders about overlooked medical interventions; enabling a more thorough evaluation of the patient

Allow patients to make well-informed decisions about their health, and to weigh all of their options in relation to their medical condition



Benefits

- Analysis of alternative options with patients
- Alerts stakeholders about **overlooked medical interventions** and provides alternative suggestions
- Able to assist in **gathering and analyzing data to expedite the process**
- More **objective assessment** of a patient's capacity

Capitalizing the Benefits

- **Combined with UpToDate**
- Integration with the Electronic Health Record (EHR)



Risks

- Medical professionals **relying too heavily on the CDS tool**
- Exclusion of ethical restrictions as a result of **one-sided solutions**
- Creation of alerts:
 - Alert fatigue
 - High overriding rates

Risk Mitigation Strategy

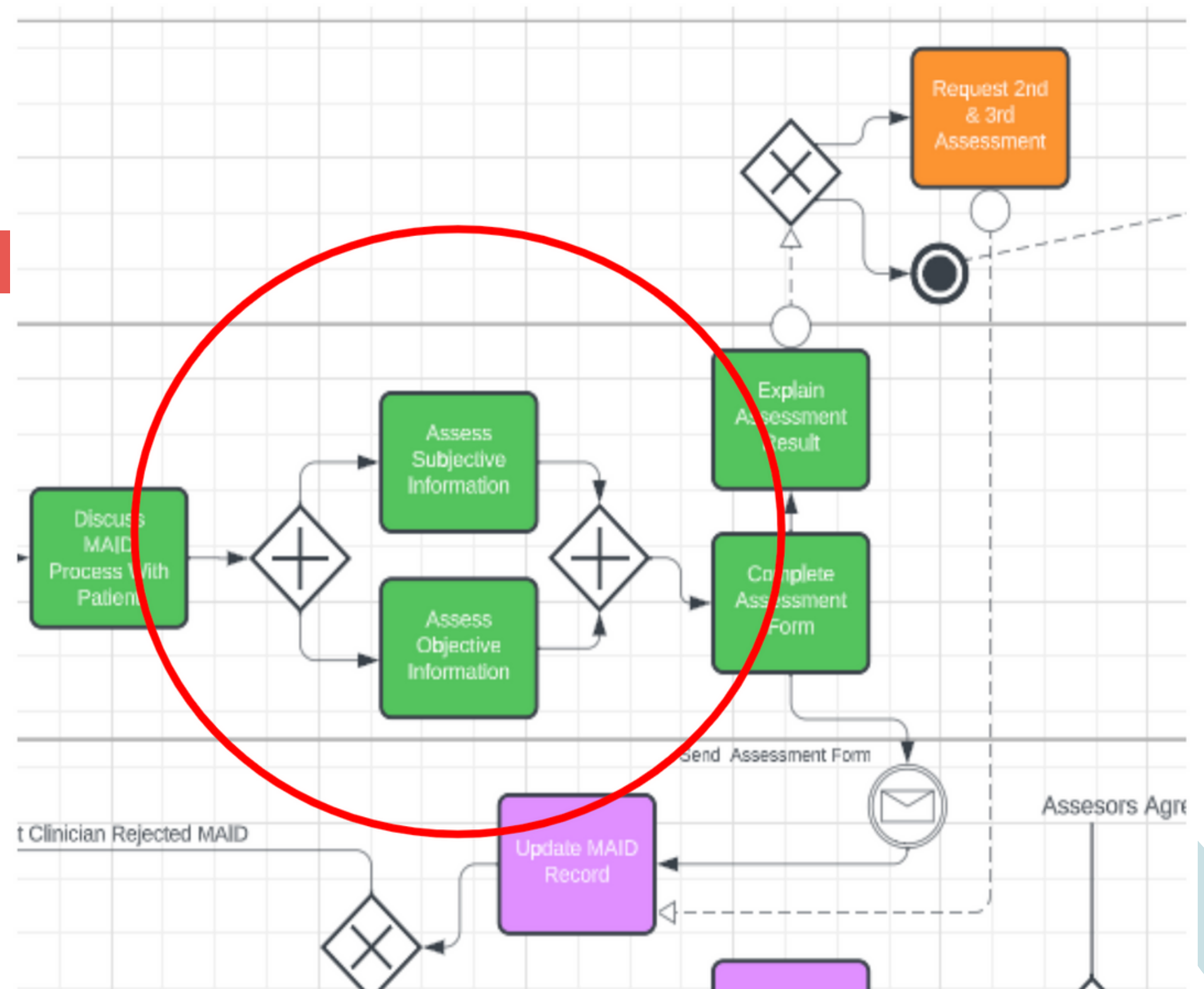
- CDS tool **should not be depended upon exclusively**, and should only be used as a tool to **support clinical judgement**
- An alerting system that maintains color coding according to priority levels



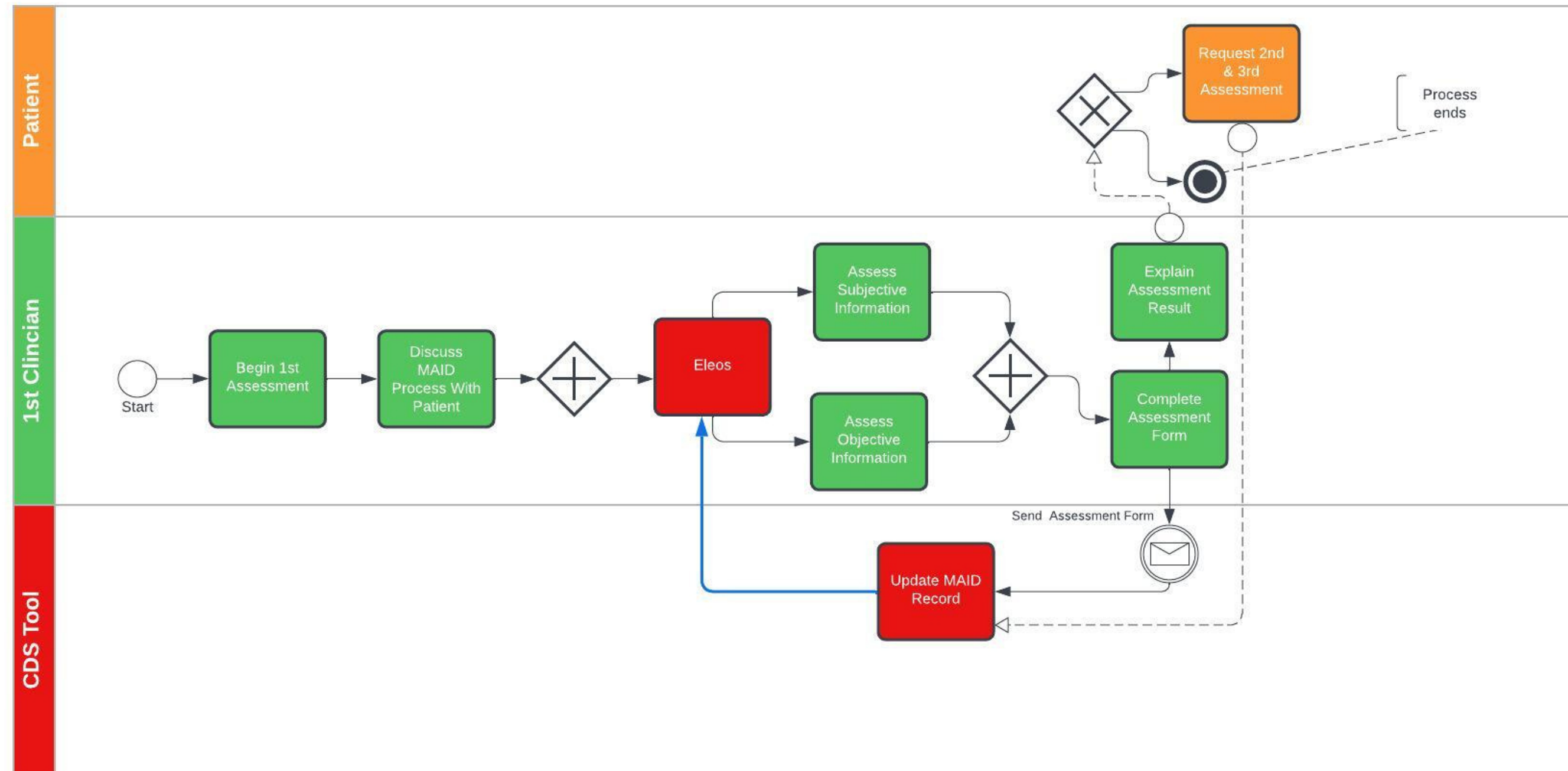
FUTURE STATE ANALYSIS

MAID Eligibility CDS Tool

- Targets assessment of subjective and objective information for eligibility

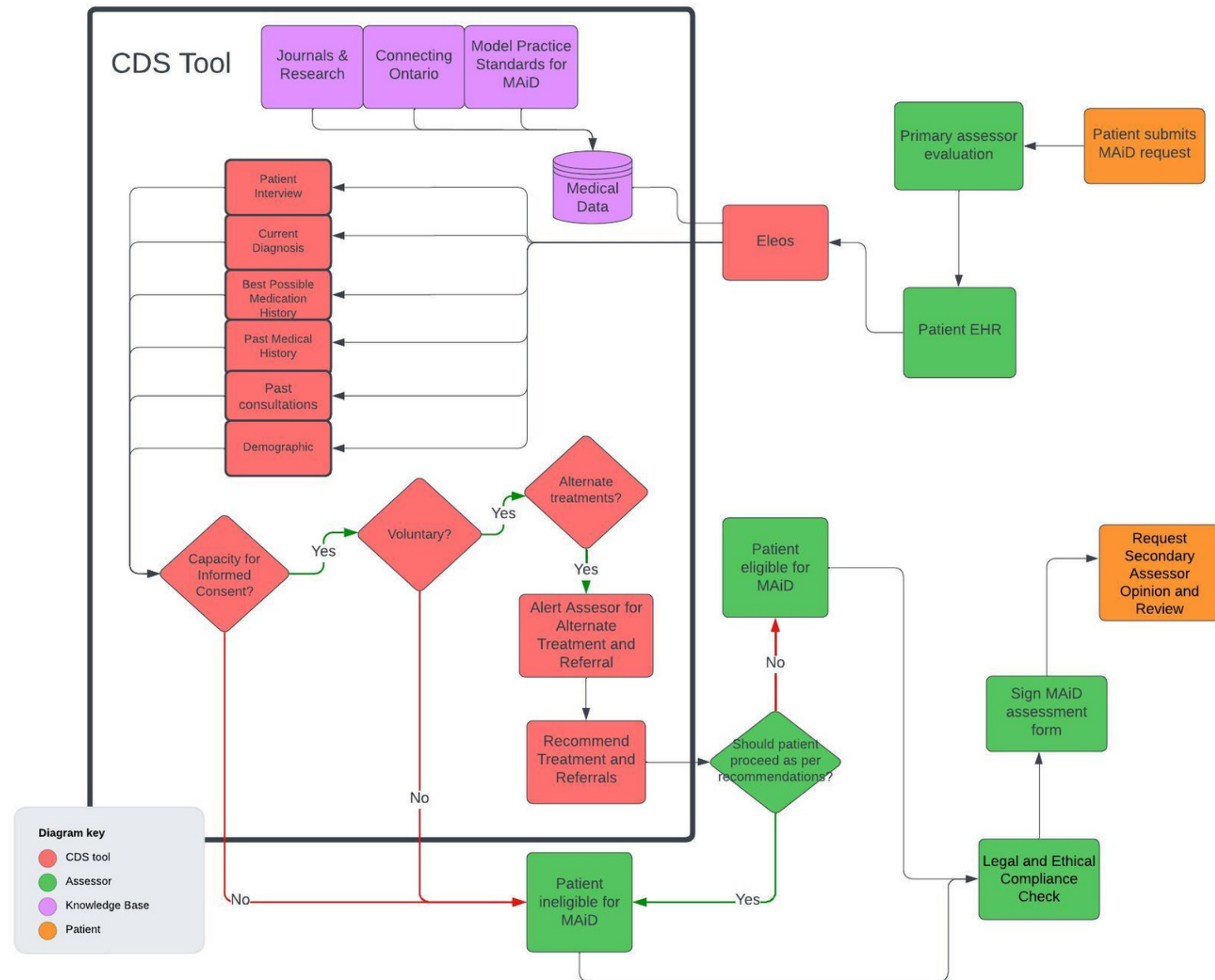


Level 3 As-is Current State Process BPMN For Conduction of MAID Assessments by Clinicians

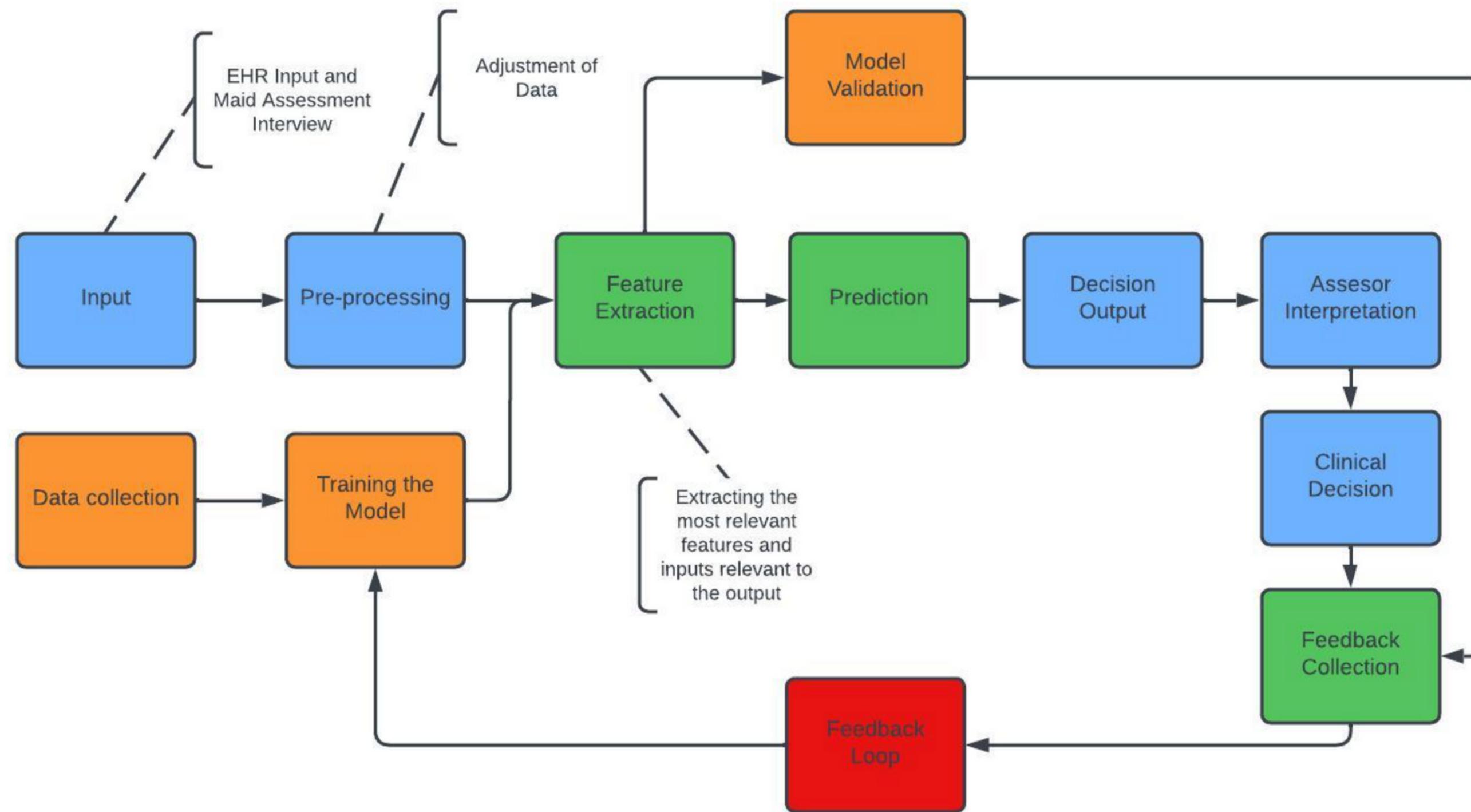


Created in Lucidchart, www.lucidchart.com

- Key interaction points
 - Auto Populating
 - Determining eligibility
 - Alternate treatments and referrals
- Knowledge Base
 - Journals and Research
 - Connecting Ontario
 - Model practice standards for MAiD



Determining Eligibility with Machine Learning



Important Considerations in AI CDS Tools

MAID rejection is **infrequent** (**Overfitting**)

- a. training data set may **skew** the machine learning model **against** MAID eligibility
- b. **Dataset in Canada has only existed since 2016**

Good or Bad: Are there **enough relevant features** to make **objective decisions** for an objective eligibility output?

- a. **Dataset in Canada has only existed since 2016 x 2**
- b. If we extract features, is there still enough information to make a decision?

Ethical concern: Why judge the eligibility for MAID of one patient based on another patients outcome?

- Auto populate patient information onto the assessment form downloaded into the computer

☐ The patient is 18 years of age or older.

☐ I am of the opinion that the patient is capable of making decisions with respect to their health.

☐ The patient has a grievous and irremediable medical condition.

☐ The patient has a serious and incurable illness, disease, or disability.

How long has the person had a serious and incurable illness, disease or disability?

☐ Less than 3 months ☐ Between 3 months and less than 1 year ☐ Between 1 – less than 5 years

☐ Between 5 – less than 10 years ☐ Between 10 – less than 20 years ☐ 20 years or more

☐ Do not know

Indicate the serious and incurable illness, disease or disability (Select all that apply)

Cancer ☐ Breast ☐ Colorectal ☐ Hematologic ☐ Lung ☐ Pancreas

☐ Prostate ☐ Ovary ☐ Other (specify) ►

Neuro ☐ Amyotrophic lateral sclerosis ☐ Dementia ☐ Multiple sclerosis

☐ Parkinson's Disease ☐ Other (specify) ►

Respiratory Disease ☐ Chronic Obstructive Pulmonary Disease ☐ Pulmonary Fibrosis

☐ Other (specify) ►

Cardio-vascular Condition ☐ Atrial Fibrillation ☐ Congestive Heart Failure ☐ Vasculopathy

☐ Other (specify) ►

Organ Failure ☐ Kidney ☐ Liver ☐ Other (specify) ►

☐ Diabetes

☐ Frailty

☐ Autoimmune condition

☐ Chronic Pain

☐ Mental Disorder (excludes neurocognitive/neurodevelopmental conditions)

(specify) _____

☐ Other condition/co-morbidity (specify) _____

☐ The patient is in an advanced state of irreversible decline in capability.

What reasons led you to this opinion? (Select all that apply)

☐ Unable to do most or all activities of daily living (ADLs) and/or instrumental activities of daily living (IADLs)

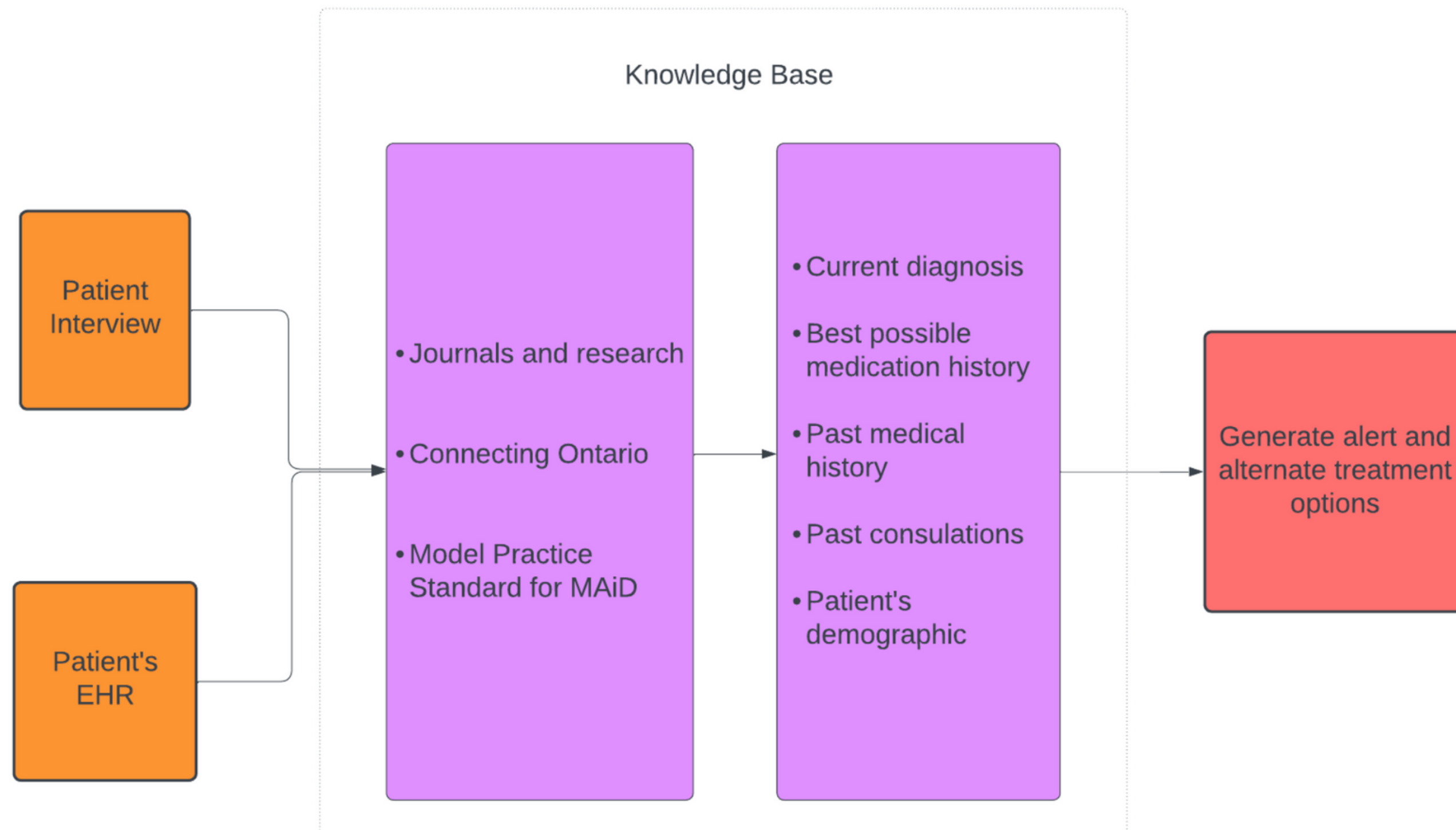
☐ Reduced or minimal oral intake or difficulty swallowing

☐ Dependent on life sustaining treatments (e.g., transfusions, dialysis, feeding tube, O2, bipap)

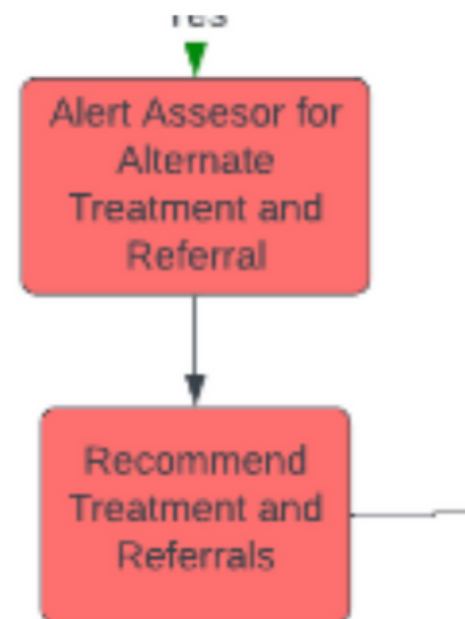
☐ Significant dependence on aid(s) for interaction/or mobility (e.g., hearing aids, magnifying equipment, speech supports, memory strategies) and/or mobility, or advanced beyond use of these aids

☐ Severe shortness of breath

Generating Alerts and Alternative Treatments



Alerts



Critical

Patient **do not** appear to meet capacity for informed consent

Dismiss

Acknowledge



Important

Patient have these **recommended treatments available** that might not have not been explored

Dismiss

Acknowledge

ELEOS

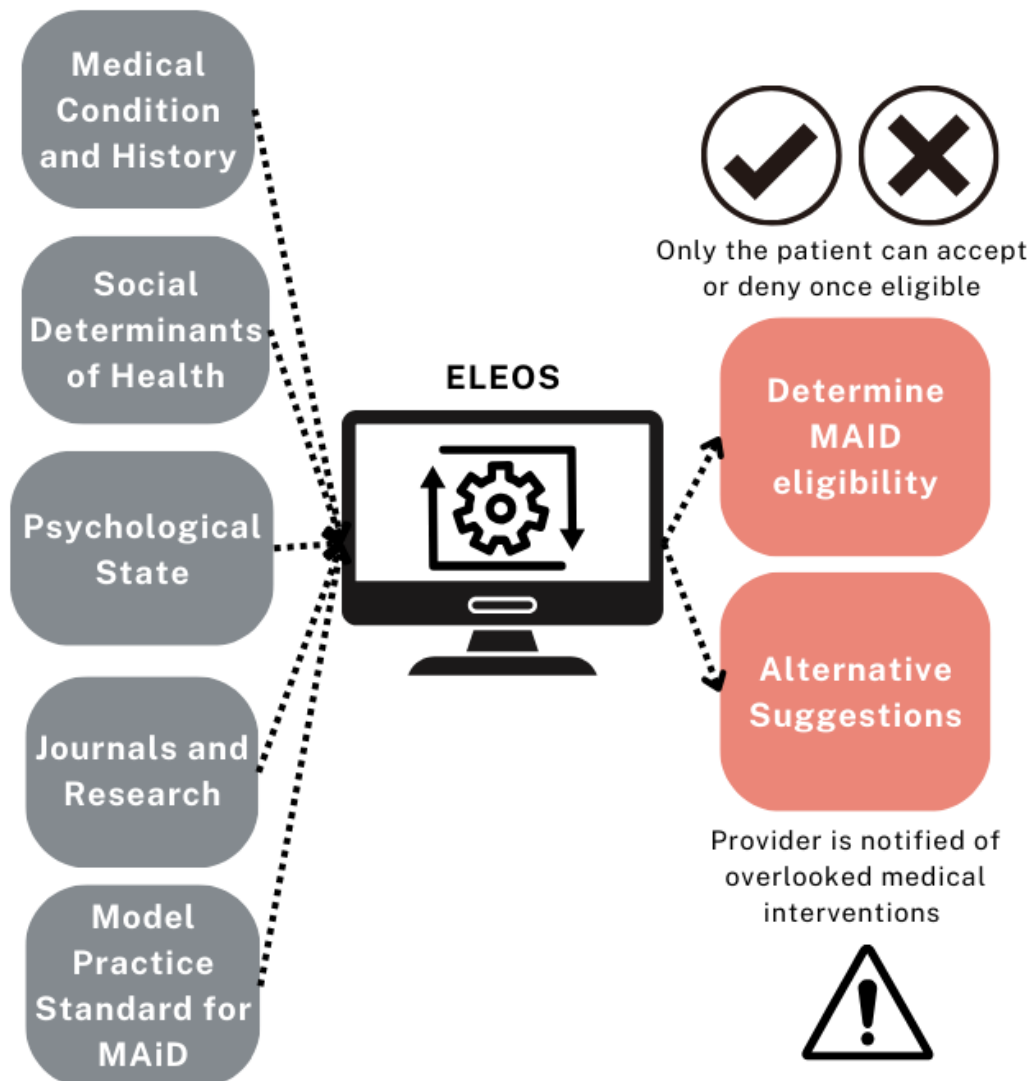


Eleos is a Clinical Decision Support tool. It aims to effectuate the eligibility criteria for MAID and create a more patient-centric approach to care.

Did you know?

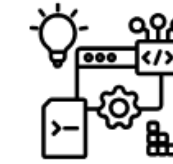
In 2022, there were 13,241 deaths by MAID. This accounts for **4.1%** of all deaths in Canada
(Government of Canada, 2022)

How does ELEOS work?



Infographic

Features



Integration with other CDS (ie. UpToDate)



Confidence Level% Decision Format



Auto-populated MAID Forms



Bi-directional interoperability with MAID department



Ongoing updates based on research findings



Compare Recommendations

References

Fourth annual report on Medical Assistance in Dying in Canada 2022 - Canada.ca. (2022). Canada.ca. <https://www.canada.ca/en/health-canada/services/publications/health-system-services/annual-report-medical-assistance-dying-2022.html>

Stakeholder Engagement Strategy

Stakeholder	Type	Influence	Interest	Action	Strategy
Canadian Association of MAID Assessors and Providers	Keep Satisfied	High	Very High	<p>Involve in implementation of CDS tool</p> <p>Garner feedback on feasibility and efficacy of CDS tool</p>	Regular workshop and training sessions for CDS tool use and integration
Health Canada	Manage Closely	Very High	High	Maintain documentation on development of CDS tool	Ensure compliance to clinical guidelines
Research Ethics Board	Keep Informed	High	Very High	Involve in CDS tool development	Outline clinical decision-making protocols
SWE	Manage Closely	High	Moderate	Collaborate in design and usability of CDS tool	Schedule information session on technical support in CDS use

If an AI CDS tool becomes extremely effective, is there a purpose to having a physician or medical professional present?

References

Government of Canada (2023). Canada's medical assistance in dying (MAID) law. Retrieved from <https://www.justice.gc.ca/eng/cj-jp/ad-am/bk-di.html#s0>

Health Canada. (2023, August 18). Medical assistance in dying: Overview. Canada.ca. Retrieved from <https://www.canada.ca/en/health-canada/services/health-services-benefits/medical-assistance-dying.html>

Health Canada. (2023). Model Practice Standards for Medical Assistance in Dying (MAiD). Retrieved from <https://www.canada.ca/en/health-canada/services/publications/health-system-services/model-practice-standard-medical-assistance-dying.html>

Ontario.ca. (n.d.). Clinician aid B - (primary) "medical practitioner" or "nurse practitioner" medical assistance in dying aid - central forms repository (CFR). Forms. Retrieved from <https://forms.mgcs.gov.on.ca/en/dataset/014-3890-22>

Shavelson, L., Battin, M., and Pope, T. (2023). Medical aid in dying: Clinical considerations. UpToDate. Retrieved from <https://www.uptodate.com/contents/medical-aid-in-dying-clinical-considerations/print>