Screening tools for the assessment of prescribing in older patients: Should we STOPP&START?

Olivia Dalleur
16.12.2013

Anne Spinewine, promoter (LDRI)
Benoît Boland, co-promoter (IRSS)
Ageing in the European Union

Bernd Rechel, Emily Grundy, Jean-Marie Robine, Jonathan Cylus, Johan P Mackenbach, Cecile Knai, Martin McKee

Editorials

21st century health services for an ageing population:
10 challenges for general practice

Encore trop de médicaments prescrits aux seniors

Mots clés : Surmédication, gériatrie, AUTOMEDICATION, Iatrogénie
Par Anne Prigent - le 23/04/2012

Chutes, hémorragies digestives, insuffisances rénales : la surmédication peut avoir des conséquences redoutables.

Overdosing The Elderly
Many older Americans are taking the wrong drugs
By Christine Gorman | Monday, Aug. 08, 1994
Drug-related problems in elderly patients

- Up to 35% community-dwelling older people ⇒ Adverse Drug Events
- 10 to 30% of hospitalizations ⇒ drug related problems
- 32-69% of Adverse Drug Events = preventable
Appropriateness

- Introduction
- STOPP&START
- Current situation
- Closer look at the criteria
- Improvements
- Discussion

[Diagram showing the relationship between maximizing effect, minimizing cost, respecting patient's choices, and minimizing risk.]
Approaches for optimisation

- Educational approaches
- Multidisciplinary team interventions
- Involvement of geriatric evaluation and management (GEM) teams
- Pharmacist interventions
- Computerized decision support systems
Inappropriate prescribing

Overuse
Misuse
Underuse
Tools

- Implicit  ➔ Medication Appropriateness Index
- Explicit  ➔ STOPP&START
STOPP&START
STOPP (Screening Tool of Older Person’s Prescriptions) and START (Screening Tool to Alert doctors to Right Treatment). Consensus validation

P. Gallagher¹, C. Ryan², S. Byrne², J. Kennedy² and D. O’Mahony³

- **European**, 2008
- Evidence-based
- Consensus opinion of a panel of **experts** in geriatric medicine, clinical pharmacology, psychiatry of old age, pharmacy and general practice
- **Validated** (Delphi)
- Inter-rater reliability: **pharmacists/physicians**

- Organized by **system + relevant** categories in geriatrics
The tool

- **STopp** : 65 situations « at risk » linked with 29 drugs

  Table 1. **STopp**: Screening Tool of Older People’s potentially inappropriate Prescriptions. The following drug prescriptions are potentially inappropriate in persons aged ≥ 65 years of age.

  **A. Cardiovascular system**
  1. Digoxin at a long-term dose > 125 μg/day with impaired renal function* (increased risk of toxicity) [Cusack et al. 1979, Gooselink et al. 1997, Haas and Young 1999].
  2. Loop diuretic for dependent ankle edema only i.e. no clinical signs of heart failure (no evidence of efficacy, compression hosiery usually more appropriate) [Alguire and Mathes 1997, Kolbach et al. 2004].

- **START** : 22 situations « at risk » linked with 15 drugs

  Table 2. **Start**: Screening Tool to Alert doctors to Right, i.e. appropriate, indicated Treatments. These medications should be considered for people ≥ 65 years of age with the following conditions, where no contraindication to prescription exists.

  **A. Cardiovascular system**
  2. Aspirin in the presence of chronic atrial fibrillation, where warfarin is contraindicated, but not aspirin [Hart et al. 1999, Ross et al. 2005].
Mme B a 88 ans. Elle vit seule dans sa maison, avec l'aide d'une infirmière 2x/semaine. Mme B a fait plusieurs chutes ces 12 derniers mois, elle a peur de chuter et a des troubles de l'équilibre.

**Antécédents:** ostéoporose (multiples fractures), cataracte opérée, infarctus récent, hypertension et diabète insulino-requérant (Hb1ac = 6,7%)

**Médicaments** habituels :
- Movicol si besoin
- Loramet 1mg 1x/j
- Asaflow 80mg 1x/j
- Zocor 40mg 1x/j
- Emconcor 10mg 1x/j
- Aprovel 300mg 1x/j
- Insuline Humuline 2x/j

**STOPP :**
1. Lormetazepam et chutes
2. Bisoprolol et diabète "trop" contrôlé donc probablement associé à des hypoglycémies (Hb1ac <7%)

**START :**
3. Traitement de l'ostéoporose connue
Why STOPP&START?

- European Union Geriatric Medicine Society

- STOPP-drugs ↑ risk of adverse drug events
- STOPP&START ↑ quality of prescribing

Published studies using STOPP and/or START
Should we use STOPP&START?

- How valid?
  - Validity of the measurements
  - Content?
  - Predictive?

- How much?
  - Measurements with the tool
  - Prevalence?
  - Drugs?
  - Risk factors?

- How better?
  - The tool as support to optimize prescribing
  - Improvement?
  - Sustainability?
  - Operationalisability?
Should we use STOPP&START?

- **Observational**
  - Population
  - Hospital/Primary care
  - Frail/Very old

- **The current situation**

- **Closer look at the criteria**
  - **Qualitative**
    - Experts’ views
    - Users’ views

- **Interventional**
  - Prevention
  - Action

- **The improvements**
THE CURRENT SITUATION
The current situation

Inappropriate Prescribing and Related Hospital Admissions in Frail Older Persons According to the STOPP and START Criteria

Olivia Dalleur · Anne Spinewine · Séverine Henrard · Claire Losseau · Niko Speybroeck · Benoit Boland

Inappropriate prescribing in subjects aged 80 and older: the BELFRAIL population

Design and populations

• Objective:
  – Detection of potentially inappropriate prescribing according to STOPP&START

Admitted patients

– Cross-sectional study in a teaching hospital in Brussels
– 302 geriatric patients
  – Comprehensive Geriatric Assessment
  – >75y
  – Non-elective admission 2008
  – Frailty (ISAR >1)

Community-dwelling patients

– Post-hoc analysis of the baseline data of the BELFRAIL cohort
– 567 patients recruited by their general practitioner
  – Inclusion: ≥80y, 2008-2009, Comprehensive Geriatric Assessment
  – Exclusion: severe dementia, palliative care, medical emergency
Patients characteristics

Admitted patients

- Age 84
- Women 63%
- Nursing home 17%
- Polypharmacy 74%
- Cognitive disorder 25%
- Frail

Community-dwelling patients

- Age 84
- Women 63%
- Nursing home 10%
- Polypharmacy 61%
- Cognitive disorder 16%
- Robust

STOPP&START

Current situation
Closer look at the criteria
Improvements
Discussion

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Drugs to target

Admitted patients

- 48% of patients have ≥ 1 STOPP (0.7/patient)
  - BZD 24%
  - Aspirin 12%
  - Opiates 8%
  - β-blockers 6%
  - TCA 5%
- 63% of patients have ≥ 1 START (1.2/pt)
  1. Diabetes
  2. Osteoporosis
  3. P2 CV
  4. Atrial fibrillation
  5. COPD

Community-dwelling patients

- 41% of patients have ≥ 1 STOPP (0.6/patient)
  - Aspirin 21%
  - Duplication 6%
  - BZD 5%
  - NSAIDS 5%
  - α-blockers 2%
- 59% of patients have ≥ 1 START (1.1/pt)
  1. P2 CV
  2. Diabetes
  3. Osteoporosis
  4. Chronic heart failure
  5. COPD

Pt Patient BZD benzodiazepines, TCA tricyclic antidepressants P2CV secondary cardiovascular prevention COPD chronic obstructive pulmonary disease
START > STOPP!

START in 60% patients > STOPP 40-50%
Drugs to target
Underuse of anticoagulation in atrial fibrillation

Anticoagulation underuse is inappropriate and associated with aspirin in frail older patients with atrial fibrillation

Frédéric Maes, Olivia Dalleur, Séverine Henrard, Dominique Wouters, Christophe Scavée, Anne Spinewine, Benoit Boland.
Underuse of anticoagulation

- Prevalence/Predictors/Stroke vs. bleeding risks?

- Design:
  - Cross-sectional study (Saint-Luc)
  - from Jan 2008 to Dec 2010
  - **773** patients
  - Inclusion: ≥75y, atrial fibrillation, high stroke risk
  - Exclusion: other indication, contra-indication
50% underuse

- **anticoagulation**
- **antiplatelets**
- **no antithrombotics**
Main predictor of underuse = aspirin

• current antiplatelet therapy ↑ risk of underuse

• No association with
  – geriatric syndromes (falls, cognitive disorder,...)
  – risk of stroke
  – risk of bleeding (-antiplatelets)
  – previous stroke
Anticoagulation = favourable

Annual risk of cardioembolic stroke (untreated)

Annual risk of intracranial bleeding or death (treated)
Should we use STOPP&START?

The current situation
- Observational
  - Population
  - Hospital/Primary care
  - Frail/Very old

Closer look at the criteria
- Qualitative
  - Experts’ views
  - Users’ views

The improvements
- Interventional
  - Prevention
  - Action
CLOSER LOOK AT THE CRITERIA
Qualitative study: Views of general practitioners

Views of general practitioners on the use of STOPP&START in primary care: a qualitative study.

O. Dalleur, J-M. Feron, A. Spinewine
Qualitative study

- 129 GPs
- Closed and open questions
- Tools, barriers

- 43 participants (GPs, pharmacists, geriatricians)
- First insight

- 27 GPs (3 focus groups)
- Vignettes
- Advantages, pitfalls

STOPP&START

Introduction
Current situation
Closer look at the criteria
Improvements
Discussion

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GP general practitioners
Views of GP about STOPP&START

<table>
<thead>
<tr>
<th>Agreement between general practitioners</th>
<th>Incentives to use the tool</th>
<th>The advantage is that you can maybe put your finger on things you had overlooked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Barriers to use the tool</td>
<td>If...if you start implementing that, you need to allow twenty minutes, in fact even more, half an hour just to check the list to see what will be added or removed and also another quarter of an hour for talking with the patient.</td>
</tr>
<tr>
<td>Diverging views between general practitioners</td>
<td></td>
<td>I mean to say, it doesn't teach us anything! Well, not much, anyway. What it will do is remind us...that we have to stop and think about things.</td>
</tr>
</tbody>
</table>
Projected use of the tool

- Adaptations for practice
  - Computerization
  - Education
- Best moment for use
  - Selected patients
  - Schedule for treatment review
- Team work, *interdisciplinarity*
- Voluntary use
Mme B a 88 ans. Elle vit seule dans sa maison, avec l'aide d'une infirmière 2x/semaine. Mme B a fait plusieurs chutes ces 12 derniers mois, elle a peur de chuter et a des troubles de l'équilibre.

Antécédents :
- Ostéoporose (multiples fractures),
- Cataracte opérée,
- Infarctus récent,
- Hypertension et diabète insulino-querant (Hb1ac = 6.7%)

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STOPP :
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2. Bisoprolol et diabète "trop" contrôlé donc probablement associé à des hypoglycémies (Hb1ac <7%)

START :
3. Traitement de l'ostéoporose connue
STOPP&START criteria frequently rated as of major clinical importance

• **STOPP**
  – Aspirin and warfarin in combination
  – Neuroleptic drugs & falls
  – Diltiazem or verapamil & moderate/severe heart failure
  – Long-term long-acting benzodiazepines
  – Selective serotonin re-uptake inhibitors & hyponatremia

• **START**
  – Warfarin & chronic atrial fibrillation
  – Antiplatelets / statins & secondary cardiovascular prevention
  – Angiotensin converting enzyme inhibitor & chronic heart failure/acute myocardial infarction
  – Calcium and vitaminD & osteoporosis
No consensus?

- ≠ implicit judgement
- Patient background / data available
- Criterion content

- Introduction
- STOPP&START
- Current situation
- Closer look at the criteria
- Improvements
- Discussion

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Variable relevance of STOPP recommendations

- The 84 inappropriate medications (STOPPs) present upon admission of 50 patients
- 3 experts
Mme B a 88 ans. Elle vit seule dans sa maison, avec l'aide d'une infirmière 2x/semaine. Mme B a fait plusieurs chutes ces 12 derniers mois, elle a peur de chuter et a des troubles de l'équilibre.

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- Observational
  - Population
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**Closer look at the criteria**
- Qualitative
  - Experts’ views
  - Users’ views

**The improvements**
- Interventional
  - Prevention
  - Action
THE IMPROVEMENTS
¼ admission potentially related to STOPP&START

<table>
<thead>
<tr>
<th>Main reason for admission (n=302)</th>
<th>Medications prescribed/omitted inappropriately</th>
<th>n</th>
<th>PPV&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STOPP-related admission</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall with fracture</td>
<td>Fall-risk–increasing drugs&lt;sup&gt;c&lt;/sup&gt;</td>
<td>46</td>
<td>0.68</td>
</tr>
<tr>
<td>Bleeding</td>
<td>Aspirin/NSAID</td>
<td>3</td>
<td>0.07</td>
</tr>
<tr>
<td>Heart failure</td>
<td>NSAID</td>
<td>2</td>
<td>0.25</td>
</tr>
<tr>
<td><strong>START-related admission</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall with fracture</td>
<td>Calcium, vitamin D and bisphosphonates</td>
<td>19</td>
<td>0.25</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>Antiplatelets</td>
<td>5</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Statins</td>
<td>5</td>
<td>0.09</td>
</tr>
<tr>
<td>Stroke</td>
<td>Antithrombotic agents</td>
<td>2</td>
<td>0.06</td>
</tr>
</tbody>
</table>

*NSAID* nonsteroidal anti-inflammatory drug, PPV positive predictive value

<sup>a</sup> Only the most frequent inappropriate prescribing events are listed.

<sup>b</sup> PPV = the number of patients who had an admission potentially related to inappropriate prescribing of a drug divided by the number of patients who had that drug prescribed inappropriately.

<sup>c</sup> Fall-risk–increasing drugs: benzodiazepines (n = 35), opiates (n = 10), neuroleptics (n = 12) and antihistamines (n = 2)
Randomized controlled study with STOPP

Reduction of potentially inappropriate medications using the STOPP criteria in frail older inpatients: a randomized controlled study

O. Dalleur, B. Boland, C. Losseau, S. Henrard, D. Wouters, N. Speybroeck, J.M. Degryse, A. Spinewine
Internal geriatric consultation Team (IGCT)

- Introduction
- STOPP&START
- Current situation
- Closer look at the criteria
- Improvements
- Discussion

1. Comprehensive geriatric assessment
2. Recommendations and advices

Geriatric patient

Non-geriatric ward

Cares for the
RCT STOPP

• Objective
  – Reduction of inappropriate medications at hospital discharge
  – Follow-up 1y

• Intervention
  Systematic screening with STOPP + recommendations
Patients flow

Enrolment

Randomized
n=158

Allocation

CONTROL
n=81

INTERVENTION
n=77

Primary outcome discharge

n=72

n=74

Secondary outcome follow-up

n=24

n=26

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The improvements

- **Discharge**
  
  STOPP discontinuation rate at discharge *X2*  
  (-40% vs. -19%, p=0.013).

- **Follow-up**
  
  - 93% answers
  - 50 patients
  - STOPP not restarted

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### Graph

**STOPP (n)**

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission</td>
<td>36</td>
<td>48</td>
</tr>
<tr>
<td>Discharge</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>1-year post discharge</td>
<td>23*</td>
<td>27**</td>
</tr>
</tbody>
</table>

- * -9 +3
- ** -8 +8
The improvements

- STOPP screening + recommendations
  - discontinuation x2 at discharge
  - persist one year

  ⇒ Knowledge on geriatric pharmacotherapy = needed
  ⇒ Systematic screening = efficient
  ⇒ Hospital admission = good opportunity
  ⇒ Collaborating with general practitioners = essential

- START?
LEARNINGS AND PERSPECTIVES
% of all inappropriate prescribing events detected by STOPP&START

Benzodiazepines
Duplication
NSAIDS
CV prevention
Osteoporosis
Atrial fibrillation
## Short version of STOPP&START?

<table>
<thead>
<tr>
<th></th>
<th>Top 10 of most frequent inappropriate prescribing&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Good predictive validity&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Major relevance&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>START</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACEIs</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Aspirin</td>
<td>*</td>
<td></td>
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<tr>
<td>Statins</td>
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<tr>
<td>Warfarin</td>
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<td>*</td>
<td>*</td>
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<tr>
<td>Ca/vitD/ biphosphonates</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<tr>
<td>Inhaled b2-agonist/ anticholinergic</td>
<td>*</td>
<td></td>
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</tr>
<tr>
<td><strong>STOPP</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Benzodiazepines</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<tr>
<td>Aspirin</td>
<td>*</td>
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<tr>
<td>Calcium channel blockers</td>
<td>*</td>
<td></td>
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<tr>
<td>Duplication</td>
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<tr>
<td>NSAIDs</td>
<td>*</td>
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<tr>
<td>Neuroleptics</td>
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<tr>
<td>SSRIs</td>
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</tbody>
</table>

Abbreviations: ACEIs angiotensin-converting enzyme inhibitors; Ca Calcium;; NSAIDS non steroidal anti-inflammatory drugs; PPIs proton pump inhibitor; SSRI selective serotonin reuptake inhibitor; TCAs tricyclic antidepressants.

<sup>a</sup> most frequent criteria detected in chapters I and III; <sup>b</sup> according to chapter I and Gallagher et al.; <sup>c</sup> according to the experts in chapters III and IV.
### Recommendations to improve validity and applicability of STOPP&START

<table>
<thead>
<tr>
<th>General comments</th>
<th>Recommendations to improve the validity of the criteria</th>
<th>Recommendations to improve the applicability of the criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>patient context</strong>&lt;br&gt;• Severity&lt;br&gt;• Cardiovascular/ neurologic&lt;br&gt;• Allergies</td>
<td>• contra-indications&lt;br&gt;• no overlap&lt;br&gt;• range of application&lt;br&gt;• time to benefit</td>
<td>• definitions&lt;br&gt;• monitoring tips&lt;br&gt;• alternatives (pharmacological and non-pharmacological)</td>
</tr>
<tr>
<td><strong>drug information</strong>&lt;br&gt;• indication&lt;br&gt;• dosage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Computerized Decision Support System ?**
Take home messages for healthcare policy makers

- **Incentives** to help the implementation of the tool and regular **medication review**:
  - one medical consultation a year
  - criteria in accredited computerized clinical decision support system
  - medication review with general practitioners and pharmacists
  - medication reviews for the local nursing home.

- **Clinical pharmacist** in the internal geriatric consultation team

- **Education**
Education

Introduction

STOPP&START

Current situation

Closer look at the criteria

Improvements

Discussion

CHAPITRE 39
MÉDICAMENTS ET PERSONNES ÂGÉES

A G O N E  S P E C I F I C A T E R

Chargé de cours à l'Université catholique de Louvain. Laboratoire de recherche Biomédicale et de Pharmacologie Clinique, Université catholique de Louvain, Clinique universitaire Geel Luc, Université de Namur, Faculté de Pharmacie et de sciences de la santé, Université catholique de Louvain, Clinique universitaire Geel Luc, Université de Namur, Faculté de Pharmacie et de sciences de la santé, Université catholique de Louvain.

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STOPP&START
Dépister nos prescriptions inappropriées chez les patients âgés

START & STOPP
Pour la bonne prise en charge des patients gériatiques à St Luc.
Selection des médicaments les plus souvent inappropriés.
Take home messages for clinicians

- Potentially inappropriate prescribing at home is **highly prevalent**
- **Underuse** > overuse
- Implemented in clinical practice on a regular basis
- Six actions would prevent 75% of potentially inappropriate prescribing:
  - Benzodiazepines
  - Duplication
  - NSAIDS
  - CV prevention
  - Osteoporosis
  - Atrial fibrillation
- **Global context** of the patient / STOPP&START does not replace good clinical judgement
- STOPP&START ⇒ multidisciplinary team, multistep approach
- Implementation in nursing homes
Perspectives

Comorbidity

Frailty

Point of view of the patient

Reasons of underuse

New oral anticoagulants

Adverse drug event

Nursing home

Clinical pharmacy and general practice

Anticholinergic burden

Length of stay

Short list

Clinical pharmacist & IGCT

Atrial fibrillation & dual therapy
L’outil STOPP&START

La situation actuelle

Les critères en question

• Observation
• Patients âgés/très âgés/fragiles
• Hôpital et ambulatoire

• Sur-utilisation: ± 40-50% patients
• Sous-utilisation: ± 60% patients

• Médicaments:
  • benzodiazépines,
  • CV (aspirine, statines),
  • Ca+vit D
  • Anticoagulants

• Qualitative
• Experts/utilisateurs

• Contenu
  • Les plus fréquents = importance modérée ou majeure
  • Influences
    • Utilisateur
    • Patient
    • Contexte

• Intervention
• Prévention (1/4 admissions)
• Action

• Diminution des médicaments inappropriés à la sortie de l’hôpital: - 50%

• Effet persistant à 1 an

• Idées pour l’implémentation: informatisation, formation, interdisciplinarité, temps pour discuter avec le patient

Améliorations
Should we STOP & START?
Thanks