Prevention of age-related disabilities: frailty outpatient clinics presentation and technological opportunities

Antoine Piau,¹²³

1-CHU de Toulouse, Gérontopôle, F-31000 Toulouse; Université Paul Sabatier, F-31000 Toulouse, France
2- CNRS, LAAS, 7 avenue du Colonel Roche, F-31400 Toulouse, France
3- Université de Toulouse, UTM, LAAS, F-31400 Toulouse, France
• The frailty syndrome

• The Platform for Evaluation of Frailty and Prevention of Disability

• Technological opportunities
Three subgroups of older adults

- **Disabled older adults**
  - Need assistance in the accomplishment of basic ADL
  - Frequently hospitalized or in institution

- **Pre-frail and frail older adults**
  - Autonomous
  - Not presenting disabilities
  - At increased risk of adverse health outcomes
  - Some degrees of functional or cognitive impairment
  - At risk of onset of dependency

- **Robust older adults**
  - Autonomous
  - No frailty or disability
Operational clinical criteria

5 Fried Frailty Criteria (Fried 2001)
- Weakness
- Low energy
- Slow walking speed
- Low physical activity
- Weight loss

- Cognitive impairment without dementia

- Poor social conditions and support
• The frailty syndrome

• The Platform for Evaluation of Frailty and Prevention of Disability

• Technological opportunities
Primary care physicians

Screening

Platform for Evaluation of Frailty

Intervention: Interventional plan Follow-up

Clinical research
Platform for Evaluation of Frailty and Prevention of Disability

In close connection with general practitioner

Multidisciplinary evaluation:
Identification of specific causes of frailty

Perzonalized preventive intervention program:
- Nutrition
- Physical exercise
- Social support
- Education

Phone contact and structured interview:
Assessment of the efficacy of the interventional plan

Reassessment after one year
• The frailty syndrome

• The Platform for Evaluation of Frailty and Prevention of Disability

• Technological opportunities
At each stage:

- Screening
- Diagnostic
- Therapeutic interventions
- Follow up and adherence
- Research
Diagnostic and interventions

• Technological tools could potentially improve the diagnostic:
  → More accuracy
  → Automation to save medical time?
  → Ecological assessment (e.g. sensors) at home, to limit bias

• And also interventions:
  → Coordination of multidimensionnel intervention
  → Remote intervention at home: E-learning
Follow-up and adherence

• Remote monitoring (worn sensors) of frailty criteria allow us to:
  → Accurately assess patient’s evolution,
  → React before autonomy loss (artificial intelligence).

• After the hospital evaluation frail elderly are all alone to perform physical interventions.
  → ICT for remote coaching together with worn sensors to provide feedback could support interventions implementation.
**Technological support for frail and pre-frail intervention**

- **Hospital**
- **Medical Practitioner**
- **Informatic self assessment questionnaire**

**Screening**

**Evaluation and tailored interventions**

- **Frailty Day Hospital** = Poly-morbid frail elderly
- **Frailty Consultation** = Frail elderly

**Remote follow-up and adherence support**

- **Technological tools**
  - Continuous follow-up and alerts
  - Motivational coaching, observance
  - Communication and social link

**Technological tools**

- Continuous follow-up and alerts
- Motivational coaching, observance
- Communication and social link
- Motivational coaching
- Personal objectives adaptation

- Feedback
- Motivational coaching

Telecare platform

Geriatrician

Internet

Touch pad

Sensors

- Frailty indicators follow-up
- Observance follow-up
- Interventions follow-up
- Alerts
**Home computer = Touch-pad**
- Patient interface
- Data collection
- Pre-treatment

**MD computer = Dash-board**
- Frailty indicators trends
- Medical relevant events
- Intervention adherence
- Alerts

**Software**
- Social network
  - Family and relative
  - Social caregivers coordination
- Connected Medical device software
  - Failure alert
  - Maintenance reminders
- Feedback software
  - Performance indicators presentation
- Motivational coaching software
  - Nutrition
  - Physical exercise
  - Therapeutic education
- Socio-cultural software
  - Transport
  - Culture
  - Shopping, home delivery

**Internet secured transmission to database**

**Hardware**
- Connected Medical device
  - Failure alert
  - Maintenance reminders
- Monitoring devices
  - Gait speed
  - Weight...
- Intervention devices
  - Wii
  - Fitness devices
- Medication devices
  - Pill-box
- Communication device
  - Ergonomic upgrade cell-phone

**Feedback software**
- Performance indicators presentation

**Motivational coaching software**
- Nutrition
- Physical exercise
- Therapeutic education

**Socio-cultural software**
- Transport
- Culture
- Shopping, home delivery