A Disease Management Program in France: Lessons from the RESALIS Experiment 18 Months Before and 12 Months After Public Health Interventions

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REES: Réseau d’Evaluation en Économie de la Santé

http://www.rees-france.com
RESALIS: A Double Bet

• Creating a sub-group of innovative health care professionals, bringing together clinicians, care workers, a health insurance fund and a pharmaceutical company.

• Demonstrating, in a pragmatic situation, that a co-ordinated care network for a chronic disease such as asthma reconciles improvement in quality of care and reduction in costs to the health insurance fund.
Key Facts

• Resalis was created as an association in 1998
• Support from the Eure CPAM CA and CNAMTS at the end of 1998
• Approved by the Soubie commission in December 1998
• First patients included in April 1999
• Inauguration of the breathing centre in 2000
• Support from FAQSV end of 2000
• First results published in 2001
A Network, to Do What?

☐ Educate
☐ Train
☐ Share
☐ Standardise
☐ Evaluate
☐ Remunerate
☐ Administer
Players in the Network

• 104 health care professionals
  – 43 doctors, 40 pharmacists, 21 paramedical staff
• a scientific council
  – Respiratory physicians, experts in medical I.T., evaluation and education systems, etc.
• an external assessor
  – REESFrance
• additional partners
  Evreux Hospital, the Evreux mayor’s office, the Eure General Council, URCAM.
Description of the Intervention

6 HEALTH PROGRAMMES

• Computerisation of the consulting clinics
• Exchange of medical and paramedical records
• Introduction of medical guidelines
• Medical training for doctors
• Patients’ educations
• Evaluation programme Continuous recording practices onto a specific database
Objectives of the Evaluation

TO DEMONSTRATE that management of patients in the context of a *Co-ordinated Care Network*® allows:

- **MEASUREMENT** of the effectiveness of treatments in everyday practice
- **EVALUATION** of the impact of a *health education programme*
- **ESTIMATION** of the economic benefits of improved management
METHOD

- Inclusion criteria
- Design of the study
- Information system
- Patient stratification
- Plan of the analysis
Inclusion Criteria

- Adults and children over 10 years old
- Asthmatic patients regardless of grade
- Patients who have given their informed consent and are prepared to attend the educational sessions offered.
- Patients who reside in the region of Eure and who do not intent to leave the region within a period of 18 months
Study Design
«Before-After» Comparison

T = Quarter after inclusion
Computerised Information System
Database Structure
15 files - 189 variables

*Detailed analysis of Ambulatory Consultations*

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATSUIVI</td>
<td>Date of visit (YYYYMMDD)</td>
</tr>
<tr>
<td>TYPEREC</td>
<td>Type of visit (medical visit, consultation, external hospital consultation, day hospital)</td>
</tr>
<tr>
<td>MAJOHONO</td>
<td>Fee increase (YES/NO)</td>
</tr>
<tr>
<td>MAJOURG</td>
<td>Emergency increase (YES/NO)</td>
</tr>
<tr>
<td>MAJONUIT</td>
<td>Night increase (YES/NO)</td>
</tr>
<tr>
<td>MAJODIM</td>
<td>Sunday increase (YES/NO)</td>
</tr>
<tr>
<td>PREXABIO</td>
<td>Prescription of the laboratory investigations (YES/NO)</td>
</tr>
<tr>
<td>PREDUC</td>
<td>Prescription of education session (YES/NO)</td>
</tr>
<tr>
<td>PRCURETH</td>
<td>Thermal cure (YES/NO)</td>
</tr>
<tr>
<td>CURHOSP</td>
<td>With hospitalisation (YES/NO)</td>
</tr>
<tr>
<td>PRSEJCLI</td>
<td>Climate residential stay (YES/NO)</td>
</tr>
<tr>
<td>AT</td>
<td>Stopped work (YES/NO)</td>
</tr>
<tr>
<td>ATTYPE</td>
<td>Type of stop</td>
</tr>
<tr>
<td>ATDUREE</td>
<td>Duration of stop (days)</td>
</tr>
<tr>
<td>ABPROFDU</td>
<td>Duration of absence from work (days)</td>
</tr>
</tbody>
</table>
Grades of Severity Defined by the General Practitioner

- **Grade 1**: intermittent asthma
- **Grade 2**: mild persistent asthma
- **Grade 3**: moderate persistent asthma
- **Grade 4**: severe persistent asthma
### Level of Drug Therapy by Grade

**GINA 1995**

<table>
<thead>
<tr>
<th>Grade 1</th>
<th>Intermittent asthma</th>
<th>No maintenance therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 2</td>
<td>Mild persistent asthma</td>
<td>Inhaled corticosteroids ($\leq 500$ µg) or Cromone or Theophylline retard. If necessary, increase corticosteroids up to 800 µg</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Moderate persistent asthma</td>
<td>Inhaled corticosteroids (800 – 1600 µg) either Beta2 LA, inhaled or oral, or Theophylline retard</td>
</tr>
<tr>
<td>Grade 4</td>
<td>Severe persistent asthma</td>
<td>Inhaled corticosteroids (1600 – 2000 µg) Inhaled Beta2 LA and/or oral Bêta2 LA and/or Theophylline retard</td>
</tr>
</tbody>
</table>

Ref : GINA 1995
Plan of the Analysis

- **Clinical end point:**
  1. number of follow ups with control during 3 months
  2. median time to no control

- **Financial end point:**
  1. mean cost of 3 month follow up with control and without control
  2. mean cost of a 3 month follow up, all combined

- **Economic end point:**
  incremental cost-effectiveness ratio of usual care 3 month follow up and follow up by the network
Clinical End Point
Control of the Asthma

Composite criteria based on the criteria of the Canadian consensus*:

• Day-time symptoms
• Night-time symptoms
• Exacerbations of the asthma
• Loss of work and absence from school
• Consumption of Beta2 mimetic agents CA
• Peak Expiratory Flow Rate

* Boulet et al.:CMAJ 1999.10: S1-S9
## Thresholds for Non-Control

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Canadian Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day-time symptoms</td>
<td>&gt; 6d /7 d</td>
</tr>
<tr>
<td>B₂SA</td>
<td>&gt; 6d /7 d</td>
</tr>
<tr>
<td>Night-time symptoms</td>
<td>&gt; 1 night/week</td>
</tr>
<tr>
<td>FEV₁</td>
<td>&lt; 80 %</td>
</tr>
<tr>
<td>Exacerbations</td>
<td>1 since the last consultation or causing the consultation on the day</td>
</tr>
<tr>
<td>Loss of work</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Quarterly Evaluation of Control

- State of control/non control was assess for each of the consultations

- The number of consultations with control and without control was counted by quarter

- If the number of non controlled consultations was > than the number of controlled consultations during a quarter ⇒ patient is not controlled for the trimester
Treatment of Missing Data

- If one or more of the 6 criteria characterising control is not documented,
- Without one of the thresholds being breached when the other items are completed,
- Then, the patient is assumed to be controlled.
Financial End Point

*Community perspective*

**Direct costs:**
hospitalisation, medical consultations,
paraclinical investigations, medicinal products

**Indirect costs:**
losses of production
**Economic End Point**

*Ranking usual care or network management according to the efficiency of follow up over a period of 3 months*

\[
\frac{\Delta C}{\Delta E} = \frac{C_{AI} - C_{W/O}}{E_{AI} - E_{W/O}}
\]

- **\( C_{AI} \)**: Cost of management after intervention
- **\( C_{W/O} \)**: Cost of management without intervention
- **\( E \)**: Number of quarterly follow ups with control
- **\( \Delta \)**: Incremental cost effectiveness
RESULTS

- Population
- Clinical impact
- Financial impact
- Economic impact
POPULATION
Patient Inclusion and Follow Up
On site study: 1st April 1999 – 24 April 2002

• **Before Phase**
  
  43  Participating doctors
  34  Doctors downloaded information
  338 Patients included
  311 Eligible patients
  
  119  Patients only had 1 inclusion visit before intervention
  192  Patients had at least 2 consultations before intervention

• **After Phase**
  
  115  Patients followed up for 12 months after intervention
Description of the Population
n = 311

- 160 men and 150 women, no details on 1
- Mean age 44.4 years ± 2.4 years
  - 10-25 years old: 20.26 %
  - > 60 years old: 30.72 %
- 19% long term sick for chronic respiratory failure (CREDES: 6%), half over 60 years old
- Median length of history of the disease: 14.5 years
- Smokers 20% (= CREDES)
- 1/3 of patients had allergic asthma (according to GP)
Continuous Data Management

• **1st April 1999 : start of the “before phase”**
  – 1st analysis : November 1999 (n = 114)
  – 2nd analysis : January 2000 (n = 171)
  – 3rd analysis : July 2000 (n = 275)
  – 4th analysis : January 2001 (n = 311)

• **24 October 2001 : start of the “after phase”**
  – 1st analysis : July 2001 (n = 115)
  – 2nd analysis : January 2002 (n = 115)
CLINICAL IMPACT
Percentages of Controlled Patients in the 1st Quarter Before Intervention and in the 1st Quarter After

<table>
<thead>
<tr>
<th></th>
<th>1st quarter after</th>
<th>Number of patients with controlled asthma</th>
<th>Number of patients with non controlled asthma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients with controlled asthma</td>
<td>20</td>
<td>5</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Number of patients with non controlled asthma</td>
<td>14</td>
<td>16</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>21</td>
<td></td>
<td>55</td>
</tr>
</tbody>
</table>

controlled before: 45 %  
controlled after: 62 %  
P = 0.04  
(McNemar test, paired samples)
Outcome of Asthmatic Patients
12 Months Follow Up Before Intervention

# 192 PATIENTS

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Follow up with control</th>
<th>Follow up without control</th>
<th>Not seen in the 3 months</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarter 1</td>
<td>70</td>
<td>68</td>
<td>54</td>
<td>192</td>
</tr>
<tr>
<td>Quarter 2</td>
<td>55</td>
<td>49</td>
<td>88</td>
<td>192</td>
</tr>
<tr>
<td>Quarter 3</td>
<td>46</td>
<td>37</td>
<td>109</td>
<td>192</td>
</tr>
<tr>
<td>Quarter 4</td>
<td>31</td>
<td>28</td>
<td>133</td>
<td>192</td>
</tr>
</tbody>
</table>

n = 311
Control and Non Control of Patients
Follow Up for 12 months Before Intervention

# 192 PATIENTS

<table>
<thead>
<tr>
<th></th>
<th>Follow up with control</th>
<th>Follow up without control</th>
<th>Number of follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarter 1</td>
<td>70</td>
<td>68</td>
<td>138</td>
</tr>
<tr>
<td>Quarter 2</td>
<td>55</td>
<td>49</td>
<td>104</td>
</tr>
<tr>
<td>Quarter 3</td>
<td>46</td>
<td>37</td>
<td>83</td>
</tr>
<tr>
<td>Quarter 4</td>
<td>31</td>
<td>28</td>
<td>59</td>
</tr>
<tr>
<td>TOTAL patient-quarter follow up</td>
<td>202</td>
<td>182</td>
<td>384</td>
</tr>
</tbody>
</table>
Outcome of Asthmatic Patients
12 Months Follow Up After Intervention

# 115 PATIENTS

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Follow up with control</th>
<th>Follow up without control</th>
<th>Not seen in the 3 months</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Quarter 1</td>
<td>53</td>
<td>31</td>
<td>31</td>
<td>115</td>
</tr>
<tr>
<td>Quarter 2</td>
<td>44</td>
<td>25</td>
<td>46</td>
<td>115</td>
</tr>
<tr>
<td>Quarter 3</td>
<td>46</td>
<td>19</td>
<td>50</td>
<td>115</td>
</tr>
<tr>
<td>Quarter 4</td>
<td>35</td>
<td>10</td>
<td>70</td>
<td>115</td>
</tr>
</tbody>
</table>

**n = 115**

<table>
<thead>
<tr>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>22</td>
<td>27</td>
<td>35</td>
<td>178</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>1</td>
<td>10</td>
<td>85</td>
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<tr>
<td>29</td>
<td>21</td>
<td>26</td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>9</td>
<td>12</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>20</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4th european conf. Health Economics - July 02
# Patient Control and Non Control
## Follow Up for 12 Months After Intervention
### # 115 PATIENTS

<table>
<thead>
<tr>
<th></th>
<th>Follow up with control</th>
<th>Follow up without control</th>
<th>Number of follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>After intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarter 1</td>
<td>53</td>
<td>31</td>
<td>84</td>
</tr>
<tr>
<td>Quarter 2</td>
<td>44</td>
<td>25</td>
<td>69</td>
</tr>
<tr>
<td>Quarter 3</td>
<td>46</td>
<td>19</td>
<td>65</td>
</tr>
<tr>
<td>Quarter 4</td>
<td>35</td>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td><strong>TOTAL patient-quarter follow up</strong></td>
<td><strong>178</strong></td>
<td><strong>85</strong></td>
<td><strong>263</strong></td>
</tr>
</tbody>
</table>
Quarterly Asthma Control Rate 12 Months Before and 12 Months After Intervention

Before  202 :  384  =  52.60

After   178 :  263  =  67.68

Incremental effectiveness = + 15.08  %
Change in Asthma Control Rate « Before - After » Intervention

Comments:
52.6% of patients controlled (before phase) vs 67.7% (after phase) i.e. a gain in patients controlled per quarter of 15.08%
Comparison of Time Spent with Controlled Asthma Before and After Intervention

Estimation of median time before becoming non controlled:

Before : 190 days
CI (95%) = [ 84 , 266 ]

After : > 352 days
CI (95%) = [ 243 , . ]

P = 0.002

* Survival time (days) = time between first follow up consultation (controlled) and becoming non controlled
## Comparability of « Before - After » Groups

### Study of Socio-Demographic Characteristics

<table>
<thead>
<tr>
<th></th>
<th>« Before » Group (n=45)</th>
<th>« After » Group (n=36)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>men: 51 % women: 49 %</td>
<td>men: 58 % women: 42 %</td>
<td>0.52</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>41.8 ± 2.9 years</td>
<td>47.5 ± 3.4 years</td>
<td>0.68</td>
</tr>
<tr>
<td><strong>CSP Occupation</strong></td>
<td></td>
<td></td>
<td>&gt; 0.30</td>
</tr>
<tr>
<td><strong>Health Insurance system</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Length of history of asthma (years)</strong></td>
<td>16.4 ± 1.8 years</td>
<td>14.3 ± 2.4 years</td>
<td>0.28</td>
</tr>
</tbody>
</table>

*Student test for continuous variables; Chi2 test for qualitative variables*
FINANCIAL IMPACT
**Mean Quarterly Cost of Follow Up (€ 2001)**

**Controlled vs Non Controlled**

- The cost of a non controlled patient for 1 quarter is always higher than that of a controlled patient.
- Impact of a rare event: hospitalisation in cost variability.
- The mean cost per quarter in the before phase is higher than in the after phase both in controlled and in non-controlled patients.
### Comparison of Quarterly costs « Before-After » (€\(_{2001}\))
All Statuses Combined

<table>
<thead>
<tr>
<th>Nature of Consumption</th>
<th>Follow up After Intervention n = 384</th>
<th>Follow up after intervention n = 263</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total costs</td>
<td>255,2</td>
<td>172,2</td>
</tr>
<tr>
<td>Direct costs</td>
<td>250,7</td>
<td>162,3</td>
</tr>
<tr>
<td>Medical costs</td>
<td>31,2</td>
<td>31,0</td>
</tr>
<tr>
<td>Drug costs (all)</td>
<td>92,5</td>
<td>103,0</td>
</tr>
<tr>
<td>Anti-asthma drug costs</td>
<td>82,0</td>
<td>92,8</td>
</tr>
<tr>
<td>Hospital costs</td>
<td>81,8</td>
<td>24,7</td>
</tr>
<tr>
<td>Investigation costs</td>
<td>45,3</td>
<td>3,6</td>
</tr>
<tr>
<td>Indirect costs</td>
<td>4,5</td>
<td>9,9</td>
</tr>
</tbody>
</table>

**Comments:**
- Reduction in total costs of 83 € per patient per quarter
- Large reduction in hospital cost: 57 € per patient per quarter
ECONOMIC IMPACT
Incremental Cost Effectiveness Ratio of Follow up of Asthma for 3 Months Before and After Intervention

\[
\text{IC} = \frac{172.13 \text{ €} - 255.23 \text{ €}}{67.7\% - 52.6\%} = \frac{-81.10 \text{ €}}{+15.08\%} (-32.4\%)
\]

- 172.13 € : Cost of 3 months follow up after intervention
- 255.23 € : Cost of 3 months follow up without intervention
- 67.7 : Rate of follow ups with control over 3 month period after intervention
- 52.6 : Rate of follow ups with control over 3 month period before intervention
Conclusion 1/2

• Change in state of health in the RESALIS* cohort, one year after introducing the network
  – 15% gain in patients whose asthma was controlled over a period of one quarter one year after introducing the network
    • 52.6% of patients controlled over a quarter in the Before Network phase
    • 67.7% of patients controlled over a quarter in the Network phase

⇒ Positive initial results for the network in terms of improvement of patient ’s state of health

* to be compared subsequently to the « others » group
Conclusion 2/2

• Changes in cost for the RESALIS* cohort, one year after introducing the network
  – Fall in total quarterly patient cost of 83 €:
    • Totally quarterly cost per patient in the before phase 255.2 €
    • Total quarterly cost per patient in the network phase: 172.2 €
  – the cost incurred by a controlled patient is invariably less than that incurred by a non-controlled patient

⇒ Positive initial results for the network in terms of reduced cost