

## Scientific Report September 2017-November 2018





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# 1. Welcome

## Welcome to the Hospinnomics' activity report (September 2017-November 2018).

This period has been the most productive for the chair since its setting up in 2014. We have continued to bridge the gap between academic research and decision-making in health and health care through our productions and events. Some of our academic research projects have indeed found their source of inspiration directly from stakeholders' concerns, whether at national or hospital level, such as experiments with innovative payments schemes or hospital Out-of-Pocket (OoP) payments (**policy-oriented research**). On the other hand, some of our academic research has been directly useful to designing regulation policy, such as drug pricing or hospital payments' reforms (**evidence-based policy**).

We have pushed forward the discipline of health economics, either by enhancing standard health technology assessments with tools from experimental economics, such as discrete choice experiments, or by using rich data and advanced econometric techniques, for instance to study life styles choices or attitudes to prevention. All along, we have systematically interacted with other clinical and social sciences (philosophy, sociology psychology). We have also actively engaged with policy makers, government and the public to **maximize the impact of our research**.

We have increased **health economics capacity and literacy** by producing the first Massive Online Open Course in health economics in French (also available in English). 33 contributors have widened the perception of economics, beyond the measurement of costs (often seen as economists' sole possible contribution) to issues in benefits' measurement, efficiency and equity.

Our research has addressed **important policy questions** including: How fine should we cut DRGs before losing all incentive power? Does grouped drug purchase reduce prices? How should we reform hospital OoPs in France? What role for peers, nudges and financial incentives in preventive care? What is the link between Orphan Drug legislation and precision medicine? Does public care crowd out private care for some segments such as obstetrics? What is the French value for statistical life (VSL) and what is its relation to quality adjusted life years (QALYs)? How balanced is drug R&D across indications? Should we reimburse physical activity?

We secured **external public funding** for a number of projects, including the H2020 European project, IMPACT-HTA led by Panos Kanavos (LSE) within which we bring experimental economics techniques (DCEs) to investigate policy-makers' willingness to invest in decrementally cost-effectiveness interventions and/or non-pharmaceutical interventions (NPIs). On the other hand, some of our large projects, such as EVALCASE, the evaluation of case management for professional injuries, for the French National Insurance Board have now come to a close.

Our applied work is based on **rigorous methodologies**: for instance, for the evaluation of the impact of case management for professional injuries, or for the evaluation of the newly set-up online appointment system for AP-HP's outpatient services, we have used advanced matching techniques to address endogeneity issues and deal with limited observations. During this period, we have indeed published 13 articles in peer-reviewed journals and 2 book chapters, on a wide range of issues. Details on all our research activities are provided in this Report.

**Capacity and team building** is essential at Hospinnomics. We are a small team, working with dedicated young researchers, with increasingly strong affiliations from senior researchers from Paris and across France (Montpellier 1 U., Lille U., GATE, Lyon U., Aix-Marseille U.). At PhD level, we are very proud that two theses were successfully defended: Véronique Raimond in December 2017 and Quitterie Roquebert-Labbé in September 2018, and we congratulate Quitterie, who has received the 2017 iHEA's **young researcher's award** for her joint paper with Marianne Tennand. During this 12-month period, we have welcomed **new members** of staff (Maria Porras, Rolando Leiva), a new PhD student (Marc-Antoine Sanchez), interns and visitors (Audrey Laporte, Derek Jones, Colleen Sheppard). Some of our members have also left the team, it includes Daniel Herrera, postdoctoral fellow, who is now assistant professor in economics at Paris-Dauphine University, Léa Toulemon, postdoctoral fellow now research assistant at the Institute of Public Policy at PSE, Laurie Rachet-Jacquet, now registered for a PhD at York U. or Noémie Kiefer, now at Bruxelles University. We hope you enjoy reading this report. For more information on our activities visit [www.hospinnomics.eu](http://www.hospinnomics.eu)

## 2. Who are we?

Hospinnomics (Hospital/Innovation/Economics) was set up, following the joint decision of the Director General of Hospitals of Paris (*Assistance Publique – Hôpitaux de Paris*), Martin Hirsch and the Director of the Paris School of Economics, Pierre-Yves Geoffard, to develop a **scientific partnership** and establish a research chair in health economics. The dual objective assigned to the chair is first to develop academic research that will have an impact on decision-making and on the other hand, to contribute towards more evidence-based decisions at AP-HP. The project aims at developing an economics research center at international level, relying on the excellence of AP-HP professionals as well as the scientific network of PSE. The partnership was signed for three years in April 2014 and the chair put in place in September 2014. It was renewed in May 2017 for five years, with a financial commitment from AP-HP for the first three years. The chair governance is composed of a steering committee, with members of AP-HP and PSE, and a Scientific Advisory Board<sup>1</sup>, meeting once a year.

Innovation constitutes one of the most important determinants of health care expenditure growth. The adoption cost of innovation is often underestimated, because it brings hope for patients and it therefore benefits from a systematic optimism bias. Its added value must however be evaluated against the value of strategies it is meant to replace, so long as public financing is involved. The assessment of the **added value of innovation**, both from an individual and a collective perspective, must be carried out in a transparent and robust manner in order to document price and reimbursement decisions. This approach belongs to the evaluation of public policies, which remains underdeveloped in the health care sector, particularly in France.

Hospinnomics aims at encouraging the application to innovation issues in the health care sector, of models from industrial, behavioral, labor and public economics. Two dimensions are considered. The first deals with **organizational innovation**, either within the production function (such as hospital mergers, task delegation, integrated care pathways) or in financing (optimal payment schemes for hospitals and primary care). The second dimension relates to **technological innovation** where comparative assessments have to be carried out between the new technology (drugs, medical devices, procedures) and the care strategy it is meant to replace.

At Hospinnomics, we aim to **bridge the gap** between health economics academic research and stakeholders' needs for evidence-based decision-making. We aim to measure progress in reference to two dynamics: academic research projects which bring scientific added value to decision-making and stakeholders' expertise which brings added value to academic research.

Hospinnomics' three-years report (2014-2017) to its Scientific Advisory Board concluded as follows: *The first three years of operation of Hospinnomics made it possible to obtain and implement publicly funded projects and to define "deliverables" adapted to AP-HP's expectations. The positioning of the Chair as a platform for **research, decision support and access to data**, as suggested by both the SAB and the Steering Committee, is recognized today. It encourages links between clinicians, decision-makers and researchers in economic evaluation, econometrics and behavioral economics, as well as social and human sciences. A multidisciplinary approach clearly offers a better response to research questions and it is now well accepted. The chair is perceived as complementary to existing structures at AP-HP, in particular the URC-Eco and proposes **methodological support** on some of the projects carried out at AP-HP, whether in Health Technology Assessment or Health Services Research. Through various research projects, post-doctorates, PhD theses and dissertations, Hospinnomics also plays an active role **for training young researchers**, who seek to be as close as possible to hospital practices and to the healthcare system in general.*

**The current activity report follows on and covers the period September 2017 – November 2018.**

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<sup>1</sup> The SAB is composed of: Pr. Robert Elliot: Labor Economist, Aberdeen University – United Kingdom, Pr. Randall Ellis: Industrial Economist, Boston University – USA, Pr. Sherry Glied: Health Economist, Columbia University – USA, Pr. Alberto Holly: Econometrician, Lausanne University – Switzerland, Pr. Audrey Laporte, Health Economist, University of Toronto, Pr. Pedro Pita Barros: Industrial Economist, University Nova de Lisboa – Portugal, Pr. Carol Propper: Public Economist, Imperial College London – United Kingdom. It was chaired for three years by Pr. Pierre Corvol (Collège de France), and now by Pr. Yazdan Yazdanpanah (AP-HP).

### 3. Highlights

This year, Hospinnomics has produced the first **Massive Online Open Course** (MOOC) in health economics in French (also available in English), with the collaboration of 33 participants, including members of its Scientific Advisory Board. It was released on the FUN (*France Université Numérique*) platform and will next be made available on Hospinnomics' website.

Engagement with the academic community took various forms this year, the most significant being the organization of the **18<sup>th</sup> European Health Economics Workshop** (EHEW) at PSE on May 18<sup>th</sup> and 19<sup>th</sup>. This event brings together theoreticians in health economics, with a restricted number of attendants and is based on a system of referees, giving a full hour for each paper presented. It was attended by junior members and provided a vehicle for Hospinnomics' training. It also strengthened the connection between the PSE research community and theoreticians in health economics in Europe.

Hospinnomics has co-organized two “**Matinées du Collège des Économistes de la Santé**”, the first on experiments with innovative payment schemes and the second on the theme of ethics and economics.

**An international workshop**, organized jointly by Hospinnomics and IRDES, has taken place at AP-HP (Hotel Scipion) on September 5<sup>th</sup>, with 80 participants on “*Why and how to reduce variations in medical practice?*”.

Jean-Claude K. Dupont has been appointed **vice-president of the Committee for economic evaluation and public health (CEESP)** of the French Authority for Health (HAS), after his renewal for a 3-year mandate. This involves also taking part in two working groups at HAS: 1) ‘Value of Information for medical devices’, 2) ‘Validation of new diagnostic indications for next generation sequencing (NGS)’.

After 2 years as president-elect, Lise Rochaix is now President of the **European Health Economics Association** (EuHEA) since the Maastricht conference on July 14<sup>th</sup>. The priorities defined for this two year mandate are 1) to strengthen the theoretical foundations of research in health economics. An example of possible actions in this respect is the development of interactions between EuHEA and members of the EHEW network, for which Hospinnomics organized a two-day session at PSE this year; 2) to strengthen the interactions with other disciplines. An example of possible actions in this respect is the organization of a EuHEA **invited session on hospital efficiency at the European Association of Hospital Managers'** annual congress in Lisbon in September this year. At national level, Lise Rochaix has been appointed to national strategic and scientific committees in relation to the current **health care systems' payment reform**.

### 4. Our Research



*In fine*, what economists are pursuing is maximizing population health. These outcomes are partly the result of the system's organizational characteristics, as well as individual's choices. Two of those key dimensions for health status are addressed at Hospinnomics and presented respectively in section 4.1 and 4.2. This research feeds back in the third theme of research, which is related to the health system's priority setting and how this process connects to the true value and returns on health of various interventions. The measurement of benefits is central here and research developed in this area is presented in section 4.3. We work on these three research priorities, which are multifaceted and we are interested in their various dimensions and interactions.

#### ***4.1 - Health care markets and reforms***

The ‘*health care markets and reforms*’ theme analyzes the system’s organizational characteristics and examines the impact of regulatory changes on competition, access and service quality. Two areas of applications have been chosen: hospitals and drugs, as they are natural topics to investigate from a policy point of view: they have important systemwide implications and strong repercussions on primary care and more generally (for prevention), in France and elsewhere.

### **4.1.1 Hospitals**



The French health care system has long been described as ‘*Hospitalo-centré*’, meaning that the hospital sector is the most important pillar around which activity is organized. The current government wants to shift to a more primary care based system. In the process, hospitals are experiencing a number of organizational changes: a) a significant concentration through mergers and acquisitions, both in the public sector with the creation of territorial hospital groups - THG, as well as in the private sector; b) a change in DRGs definition leading to refinements to encompass severity heterogeneity issues; c) Reforms of A&E departments’ funding.

#### ***a- Hospital services concentration***

The French market for hospital care is shared by public and private producers. The public sector undertakes a number of mandates usually not covered by the private sector such as training, research, patient information and disease prevention. For standard hospital care, however, one may ask whether the current level of public provision is adequate or if it partly replaces activity that would otherwise be provided by private hospitals. This research carried out by **Daniel Herrera**, postdoctoral fellow at Hospinnomics, has led to two contributions:

- A first contribution, jointly with **Lise Rochaix**, revisits the public-private mix in hospital care for a specific activity segment, i.e. maternity care provision, where users’ preferences matter, and where the French private sector undertakes up to 36% of births. We first examine to what extent public and private maternity units compete for births, to then investigate if there is displacement between public and private care. Our findings indicate that private maternity units compete with both private and public units. Interestingly, this effect is asymmetric, substitution being more likely from a private to a public maternity unit than the reverse. Further findings show that public maternity units crowd out private units only in relatively large markets. No crowding out effect is observed from the private to the public sector. *This paper n°30 will be submitted in 2019.*
- A second contribution has been produced and is part of **Joanna Piechucka**’s PhD. This paper aims to provide insights on the impact of mergers on the repositioning of hospital services by: (1) providing a theoretical framework where multiproduct firms are allowed to change their product assortment and compete in quality; (2) exploiting a rich and unique database on the French hospital industry for the years 2009-2014. Our findings show that following a merger, private hospitals distance themselves from each other by re-positioning the health services they offer. This non-cannibalization strategy provides support for our theoretical framework. Also, we find that merging and non-merging hospitals increase their quality level after merging. To our knowledge, no economic studies have attempted to evaluate the economics effects of mergers and acquisitions in the hospital industry on service repositioning. We contribute to the existing literature on the use of positioning of products/services health services as a competitive tool. We believe that such studies can help competition authorities improve their assessment of potential effects of mergers by accounting for another dimension of competition. *This paper n°32 will be submitted in 2019.*

### *b- DRG refinement*

DRG implementation varies extensively from one country to another, in particular with respect to the actual number of DRGs, which is a proxy for the strength of the incentive mechanism. Some European countries, such as France, have introduced DRG refinements, which aim at reducing the risk borne by hospitals. The 2009 reform in France, analyzed by C. Milcent (2013), aimed at introducing DRG refinements across the board and has since been followed by further DRG refinements in specific sectors, one of which being obstetrics. Research has been carried out by **Alek Proshin**, as part of his PhD, and aimed to study the effects of the French 2012 DRG refinement, which was explicitly introduced to reduce financial risks of French maternity wards. The analysis relies on quasi-experimental data from French hospitals from 2010 to 2013 and results show that the reform had a direct impact on hospital-level financial incentives but did not directly impact health care providers' practices. Using a difference-in-differences method and after controlling for multiple patient, hospital and regional characteristics and allowing for hospital and year effects, the results show that introducing new severity levels and clinical factors into the reimbursement algorithm had no significant effect on the probability of a scheduled C-section being prescribed. The results are robust to multiple formulations of financial incentives and to restricting the sample to bigger (> 15%) fee incentive changes. The results also suggest that the DRG refinement did not transmit hospital-level stimuli to midwives and obstetricians. The paper is the first study that focuses on the consequences of DRG refinement in obstetrics and develops an approach suitable for measuring fee incentives in this setting. *This paper n°27 has been submitted for publication to the Journal of Health Economics.*

### *c- A&E departments' use*

Accident and Emergency (A&E) services' congestion is becoming a major concern in France, especially for AP-HP and funding reforms are currently discussed. Recent research carried out at Paris-Dauphine university (B. Dormont et al., 2018) has shown the important levels of A&E use judged inappropriate by medical respondents to a questionnaire based on a one day activity window. Our project builds on this evidence and offers a complementary analysis, based on discharge data (*Résumés de Passages aux Urgences* - RPU) available for 4 regions between 2010 and 2015. This detailed information has been linked to other databases, which include information on A&E departments' resources, as well as characteristics of primary care supply and patient demographics in the hospital's catchment area. This unique dataset has been built as a major asset for Hospinnomics future work in this area, with contributions from **Olivier Supplisson**, MSc student in statistics and data science. Preliminary analysis using cross sectional and panel data models shows no statistically significant effect between the health supply and the volume of non-urgent patients attending the A&E departments. **Rolando Leiva** is now in charge of this project, under the supervision of **Philippe Mossé** and the next step implies testing the hypothesis that treating non-urgent patients may increase waiting time and in some cases mortality. Information on patients' morbidity, mode of arrival and need for hospitalization will be critical in order to control for severity. Also, alternative definitions of either the hospital's catchment area or measures of primary care supply will be designed and tested.

### *4.1.2 Drugs*



Our research focuses on two main areas in relation to drug markets and reforms: a) Orphan drugs and b) Drug pricing.

#### *a – Orphan drugs*

Increased focus has been devoted to rare diseases over the last decades and resulted in the adoption of policies providing incentives for pharmaceutical companies to develop innovative drugs for rare indications. Both USA and Europe introduced a special status referred to as Orphan Designation offering

financial incentives for medicines for rare diseases. Orphan Drug legislation was introduced in 2000 at the European level and offers supply-side market incentives to stimulate R&D investments levels in rare diseases areas.

Research on the equity in the allocation of R&D resources for rare diseases started at Hospinnomics with the research project on Rare Cancers funded by the National Cancer Institute (INCA) and developed in collaboration with researchers at Imperial College London: **Marisa Miraldo** during her visiting position at Hospinnomics; **Eliana Barrenho**, during her post-doctoral position at Hospinnomics. Hospinnomics is in charge of two work packages (WP) for this INCA project on rare cancers to which **Léa Toulemon** has been associated as post-doctoral fellow, as well as **Réka Halmi** as research assistant.

- In the first WP, we investigate the impact of a change in funding for hospital inpatient drugs. In hospitals financed through activity-based payment, expensive and unfrequently prescribed drugs are not included because they would induce heterogeneity in the cost per diagnostic related group (DRG). Several European countries have dealt with this issue by setting temporary supplementary lists for these drugs so they can be prescribed at no cost for the hospital. This paper studies the change in volumes and quantities when a drug is delisted from such a supplementary list and integrated back into the general DRG-based funding scheme. We combine two French hospital-level administrative datasets on drug consumption and purchase prices to trace the change in hospital prescriptions from 2008 to 2016. Volumes and average prices are measured at molecule level to take into account potential substitution across therapeutically equivalent pharmaceuticals. *This paper n° 40 will be submitted in 2019.*
- In the second WP, we analyze the distribution of clinical trials focusing on cancer drug development between 1996 and 2016, comparing the number of trials with the prevalence, incidence and survival rates of each cancer type, emphasizing the differences between rare and non-rare malignancies. Using concentration curves, in a approach defined by E. Barrenho *et al*, published in 2018 (*paper 1*), we show that the number of clinical trials is disproportionately concentrated towards common cancer types, rather than rare ones. Furthermore, this level of inequality is reduced once we control for the magnitude of the trial. Altogether high-occurrence malignancies receive disproportionately more clinical trials, enroll disproportionately more participants and collectively, last disproportionately longer. We equally observe that the disparity seems to be increasing throughout the R&D stages for non-rare cancers, but is already high in Phase 1 trials for rare cancers. These results indicate that the inequality is already predetermined at early phases of the innovation process for rare cancer trials, while it is partially explained by the lower probability of success of low-occurrence non-rare cancer trials. We further categorize cancers as hemopathy versus solid tumors and we find that non-rare cancer trials are more likely to target solid tumors whereas rare cancer trials are more hemopathy-focused. *This paper n° 28 will be submitted in 2019.*

Research on rare diseases also started at Hospinnomics as part of **Setti Raïs'** PhD dissertation, funded by the French rare diseases foundation (Fondation IMAGINE) under the joint supervision of Lise Rochaix and Sandy Tubeuf (Université Catholique de Louvain).

- A first research piece aims at measuring the impact of the market incentive scheme enacted through the Orphan Drug legislation by analyzing the variation in the number of new clinical trials and new academic publications from 1997 to 2015. It uses a Difference-in-Differences design estimated with a Conditional Fixed-Effect Poisson Model. A causal positive impact is found on the number of clinical trials from 2004 that increases over the 10 years following the legislation. The causal effect of the OD legislation on academic publications is significant and immediate after the introduction of the policy. The research indicates that pharmaceutical industries largely responded to financial incentives while allocating R&D resources. *This paper n° 35 will be submitted in 2019.*



- Rare diseases affect less than 1 in 2,000 citizens. With over 7,000 recognized rare diseases and 350 million people affected worldwide, rare diseases are not so rare when considered collectively. Rare diseases are generally underserved by drug development because pharmaceutical industries consider R&D investments in rare diseases too costly and risky in comparison with the low expected returns due to the small population involved. Eighty percent of rare diseases are not part of pharmaceutical firms' R&D agendas and such limited R&D investments might impact the access to treatments for patients with rare diseases and can lead to further health inequalities in the population. There have been considerable discussions in the philosophical and political economy literature about the role of the welfare state in promoting equity in the provision of goods and services, especially the need for public health actors to tackle health inequalities and prioritize the most disadvantaged groups. The existence of inequalities of opportunity in the allocation of R&D resources within rare diseases is further analyzed by **Setti Raïs** together with **Sandy Tubeuf** by identifying the characteristics of rare diseases that appear to determine R&D investments. Using data from Orphanet and PubMed along with stochastic dominance and bilateral tests, they show that rare diseases in children and with a smaller prevalence are underserved by R&D. R&D efforts appear to be concentrated in more profitable research areas with potentially larger sample size for trials design and adult population. *This paper n°23 is invited for revision in Social Justice Research.*
- A third piece of research investigates whether the impact of pharmaceutical innovation on mortality is larger for precision medicine drugs. In 2018, 696 drugs have approved indications for rare diseases. From the policymakers' perspectives, there are concerns about the overall impact of orphan drugs on payers' drug budgets, as orphan drugs have generally been granted high prices and R&D pipelines suggest an increase of orphan approved products in the years ahead. In recent periods, the emphasis has been made on new molecular entities for narrow indications (mostly cancer drugs) that take into account individual specificities in genes, often referred as "precision medicine". Many common diseases have been transformed into orphan ones by targeting patients' subsets offering genetics similarities and better treatment response to innovative drugs. In the US, the FDA estimates that in 2016, 41% of the approved drugs had an orphan drug indication. In this ongoing work in collaboration with **Frank Lichtenberg** (Columbia university), **Setti Raïs** estimates the reduction in mortality attributable to drug launches and academic publications in the USA during the period 1999-2015, and investigates whether the impact of pharmaceutical innovation on mortality is larger for precision medicine drugs. This work could be replicated in the French context provided mortality data with ICD codes (identifying rare pathologies) were to be made available.

### ***b- Drug pricing***

Research collaborations have been developed with representatives from AP-HP<sup>2</sup> and healthcare regulatory bodies at national level<sup>3</sup> through the setting up of a closed technical workshop on drug pricing issues. This collaboration, jointly organized for Hospinnomics by **Léa Toulemon** and **Izabela Jelovac**, has led to the publication this year of three papers in a special issue on drug pricing in the *Revue Française des Affaires Sociales*.

- The first paper (n°7) presents the different aspects of determining the price of reimbursable medicines in France. We describe the way drug prices are set according to status: in commercial distribution (brand-name and generic drugs) and in hospital distribution (*liste de retrocession* [retrocession list] and *liste en sus* [supplementary list]). Pricing issues and other recent

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<sup>2</sup> AGEPS: Assistance Publique-Hôpitaux de Paris Central Purchasing Pharmacy and URC-Eco (The Hospital HTA unit at AP-HP)

<sup>3</sup> CEPS: health care products pricing committee at the Ministry of health; HAS: The National Health Authority; ATIH: Agence Technique de l'Information Hospitalière; DREES: research division of the French Ministry of health.

developments are discussed, as well as the role of relevant institutions such as the Healthcare Products Pricing Committee (CEPS) and the French National Authority for Health (HAS).

- The second paper (n°2), written by four Paris School of Economics MSc students, under the joint supervision of **Léa Toulemon** and **Lise Rochaix**, reviews international drug pricing in the global pharmaceutical market, with a special focus on access to drugs for developing countries. Acknowledging the essential trade-off between equity and efficiency that characterizes international drug pricing, the paper provides a global perspective on drug pricing and patenting policies, identifying their consequences and limitations. In a context of increased market interactions between developed and developing countries, the challenge for these regulations is to safeguard incentives for R&D while enabling access to innovative drugs for developing countries.
- The third paper (n°9) covers early access schemes that facilitate market access for certain innovative drugs. These schemes allow pharmaceuticals, which have not yet obtained their marketing authorization (MA) to be administered and reimbursed to a pre-defined population of patients. Under the French regulatory framework, this scheme consists in a window of unregulated prices, which stands in contrast with the system of administered prices for reimbursed pharmaceuticals. The paper, written by **Setti Raïs**, jointly by members of the technical workshop at Hospinnomics, fills a gap in the literature by analyzing the French Temporary Authorization for Use (TAU) scheme since its implementation in 1994 up to 2016. This long-time span allows documenting and describing the TAU scheme and its impact on prices. The paper reviews the price differences between the freely set price under TAU and the post MA price, after negotiation with the CEPS. Results show that the 2007 regulatory change, which compelled pharmaceutical companies to reimburse the difference between the TAU price and the Post MA price, is significantly correlated with decreasing or stable post-MA-to-TAU price ratios.

Another line of research on drug pricing has been defined by **Léa Toulemon** as part of her PhD thesis, and later during her Post-doc at Hospinnomics. The paper offers an estimate of the impact of group purchasing on medicine prices in French hospitals, taking advantage of the entry of hospitals into regional purchasing groups between 2009 and 2014. Based on a new database providing the average annual prices paid for all innovative and high-priced medicines in public hospitals, Léa Toulemon uses a two-way fixed effects model that controls for hospitals' medicine-specific bargaining power and medicine-specific price trends. The results show that group purchasing slightly reduces the overall prices of medicines but has no impact on the prices of medicines that have no alternatives on the market. On the contrary, prices of medicines in oligopoly markets are extensively impacted. *The paper has been published in Health economics in 2018 (n°13) and is available as Hospinnomics' Recto Verso n°11 (n°48).*

## ***4.2 – The individual perspective on health and healthcare use***

For most people, the initial link to the system at large is primary care and prevention. The question asked here is how people experience illness and how they use the health care system. We address these questions from the patient's perspective using behavioral economics. Under this second research theme, we analyze the behavioral determinants of either lifestyle choices, or access to screening/diagnostics to understand delays or under-use (or non-use) of free screening schemes.

### ***4.2.1- Learning from health shocks and peers' experience***

Drawing on behavioral economics, the analysis considers the health shock experience as the provision of new and credible information that can be used to update both personal risk beliefs and individuals' perception of control. Using health shocks to understand behavioral determinants of lifestyle is a fruitful avenue of research, as individuals will inevitably face health shocks throughout their life. Such shocks

could be acute (e.g., traffic or workplace accidents), or chronic (e.g., cancer, diabetes, depression). Disentangling if these parameters are dependent from health shocks has, at least, three important implications. First, it improves econometric models (fixed effect models or first-difference methods are not sufficient to control for individual identity). Second, it provides new evidence that personality traits and individual preferences have an endogenous component. Third, it enhances policy recommendations in refining the way information is delivered (e.g., through augmented reality experience). This might be particularly relevant in the current context of information overload, especially in health. Further, it may also provide some explanations on why individuals have healthier lifestyles (e.g., reduce their tobacco and alcohol consumption) after experiencing a health shock.

**Antoine Marsaudon** has initiated this approach at Hospinnomics as part of his PhD dissertation. The thesis measures first the impact of health shocks on non-cognitive skills (a) and subsequently on the adoption of risky behaviors (b).

### ***a – Impact of health shocks on non-cognitive skills***

#### *- Health shock and risk tolerance:*

This paper with **Mattéo Galizzi and Sara Machado** (LSE) investigates whether health shocks influence risk preferences in a representative sample of the UK population. We use the innovative Panel of the UK Household Longitudinal Study, reconstructing each individual's health shock history in terms of both acute and chronic health shocks. Risk tolerance is measured using both incentive-compatible experimental tests for risk preferences, and self-reported Likert-scale questions for risk attitudes. The former allows us to estimate the individual risk aversion under standard assumptions. We estimate a propensity score of suffering a health shock using time invariant demographic and socioeconomic variables. The treatment group, those who have suffered from health shocks, are then matched with the individuals who have never suffered any health shocks. Our estimates suggest that, on average, health shocks do not have any systematic effect on risk tolerance. We find the same results when we analyze acute and chronic health shocks separately. *The working paper will be submitted in 2019 (n°50).*

#### *- Health shock and perception of control:*

This second paper analyzes whether a non-cognitive ability, that is, locus of control (LOC), is stable after the occurrence of a health shock, namely a hospital stay. To do so, we rely on the German Socio-Economic Panel dataset. To identify the causal effect of such shocks on LOC, we use a fixed-effects model. Results suggest that individuals facing health shocks are more likely to decrease their LOC. That is, they tend to believe that their future outcomes are more determined by external factors than their own will. This increase is attributable to individuals that had, prior to the shock, higher values of LOC. This provides evidence that perception of control is dependent of negative health events and calls to refine the one-message-fits-all strategies for changing health behaviors. Targeting hospitalized individuals with messages to improve self-control perception may be a fruitful direction. *The working paper will be submitted in 2019 (n°49) and a short presentation in the French Economics Association (AFSE) blog (n°15).*

### ***b – Impact of health shocks on risky behaviors and employment***

Another paper by **Antoine Marsaudon**, together with **Lise Rochaix**, investigates the relationship between an acute health shock, namely the first onset of an accident requiring medical care, and lifestyles using rich panel data from a large French cohort of electricity board workers. To identify the causal effects of a health shock on lifestyles, we rely on a fixed-effects model. Results suggest that there is a significant reduction in both tobacco and alcohol consumption, but no effect on body mass index (BMI) after the shocks. These reductions last over 5 and 3 years respectively. Throughout these periods, individuals subject to such a shock reduce, on average, tobacco consumption by 2 units, and alcohol consumption by 0.8 glasses (per week). Further, the findings show heterogeneous effects among

smokers: heavy smokers are more likely to reduce tobacco consumption than occasional smokers. *This paper n°26 has been submitted to Health Economics and is available as Hospinnomics' Recto-Verso n°10 (n°44), with a short presentation on PSE's short paper review series (n°16)*

A project has been developed by **Marc-Antoine Sanchez** for his PhD, under the joint supervision of **Thomas Barnay** and **Lise Rochaix**. The paper is developed in collaboration with **Antoine Marsaudon** and aims at measuring the impact of health shocks on employment. The objective of this paper is to evaluate the impact of road accidents on the career of French electricity board employees (EDF-GDF), with special emphasis on end of professional life years, based on the *Gazel* cohort for the period 2002 to 2014. This study analyses the adaptation strategies developed by firms and victims, following such an exogenous shock (with or without health consequences). It sheds light on the ability of stakeholders to adjust, in case retirement age was to be changed, as currently envisaged, in particular for special schemes such as EDF-GDF. The econometric strategy relies on a difference-in-differences method with propensity score matching. The analysis shows that accidents with serious physical or material consequences lead to an earlier exit from the labor market. A requalifying mechanism, opening retirements rights, is likely to be at work to enable earlier exits. Victims of material road accident seem to face fewer changes at the end of their careers. *This paper (n°21) has been submitted to Revue d'Economie Politique.*

### *c – Peers' effects on risky behaviors*

This line of research has been developed by **Ivan Tzintzun** as part of his PhD thesis (paper n°41). The paper explores peer effect heterogeneity in adolescent adjusted Body Mass Index (BMI), physical activity and dietary choices. In particular, this paper makes an original contribution by studying peers heterogenous effects based on friendship intensity. Adolescents are assumed to interact through a social network, where they have strong and weak friendships. To identify both types, we use Add-Health's wave II friendship roster questionnaire to calculate a friendship score for every friend listed by each student in the sample: friends with a high score were defined as part of the strong friendship network and the rest were placed in the weak friendship network. It is expected that strong friendships have a greater effect on individuals' observed outcomes. As in Liu and Lee [2010] and Dieye et al. [2017], identification conditions are provided. 2SLS and GMM strategies were used to estimate the econometric model. Preliminary results provide evidence that supports the heterogenous peer effect hypothesis: strong friendships' endogenous effects dominate on adjusted body weight, physical activity. Mixed evidence is found for fast food consumption and unhealthy food consumed calories.

## *4.2.2-Inequalities in access to diagnostic*

### *a – Social capital and education as determinants of time to diagnosis*

In this study, which is part of **Setti Raïs'** PhD thesis and written jointly with **Paul Dourgnon** and **Lise Rochaix**, time to diagnosis (defined as the timespan from first symptoms to final diagnostic for four chronic conditions) is measured, and the role played by patients' social characteristics in accounting for time to diagnosis is analyzed. Self-reported data is used from an online open access questionnaire administered to a large French social network of patients (Carenity) with chronic conditions. Duration models were used to explain variations in time to diagnosis. The results suggest that social participation and social support reduce the probability of experiencing longer periods of time to diagnosis. Higher levels of education, on the contrary, increase the probability of experiencing longer periods of time to diagnosis. We further analyze this result by identifying differences in health care-seeking behavior: more educated patients tend to first consult specialists, which is correlated with a longer time to diagnostic work-up. Indeed, ambulatory care specialists are less likely than GPs to refer patients to hospitals for additional tests, when needed. The findings on social capital support WHO's recommendations to enhance individual social capital as this could reduce the time period needed to obtain a final diagnosis. In addition, results on education suggest that public interventions aimed at

optimizing healthcare pathways through a GP referral system for specialist services may reduce time to diagnosis. *This working paper n° 34 will be submitted early in 2019.*

### ***b – Behavioral factors and delays in obtaining a breast cancer diagnosis***

Hospinnomics has been granted funds by IRESP-INCA to explore delays in obtaining breast cancer diagnostics, which have contributed to partly fund **Antoine Marsaudon's** PhD thesis. The project carried out with **Christine Le Clainche** and a **large team of researchers from the university of Paris 1, of Paris Dauphine, Télécom Bretagne and Catholic University of Louvain** aims to analyze whether personality traits (e.g., extraversion, sociability) and individual preferences (i.e., time and risk preferences) contribute to explaining potential delays. To do so, the project relies on two primary data sources: a patient online network (Carenity), and a patients' association network (Les Sentinelles). A specific questionnaire including socio-economic and behavior-related variables aims at testing two hypotheses. First, personality traits and individual preferences have an impact on preventive behaviors. Second, individuals that are more risk averse and future-oriented are more likely to have shorter delays. The survey results will be used to set up a laboratory experiment to further analyze the role of behavioral factors in explaining delays. Preliminary results based on Carenity data show no correlation between behavioral characteristics and delays but this may be partly attributed to the small sample size (110 women). The next step is to launch the questionnaire on the Sentinelles network and to subsequently carry out the econometrics analysis, using duration models.

## ***4.3 - Health benefits valuation***



One of the most commonly assumed perceptions about economists is that they are only interested in minimizing costs. Focusing research on benefits measurement at Hospinnomics has been useful in widening the lens. In fact, the health care system ought to be designed to respond to people's needs, so it is essential to ground the system's priorities in the patient's perspective. We therefore need to use patient values to inform the care provided by decision-makers and their definition of priorities. The analysis carried out in this section therefore feeds back into the system design and regulation (4.1), based on the individual analysis (4.2).

### ***4.3.1-VSL-QALY***

Research on this topic has been initiated by **Daniel Herrera** when he was an Hospinnomics postdoctoral student. Having worked for his PhD on benefit cost analysis techniques and industrial organization at Toulouse School of Economics, under the supervision of James Hammitt, it was natural for him to investigate the relationship between Value per statistical Life (VSL) and Quality-Adjusted Life Years (QALY).

- Following a first paper published with James Hammitt (*paper 5*), **Daniel Herrera**, jointly with **James Hammitt** and **Christoph Rheinberger**, provide an in-depth analysis of the properties of the marginal willingness-to-pay (MWTP) for an improvement in the quality-of-life as measured by gains in health and/or longevity. The modeling framework makes minimal assumptions about the shape of an agent's utility function and the interactions between their health, longevity, and wealth. It allows identifying an upper bound that approaches the MWTP for a QALY, and a lower bound that is proportional to the upper bound, but scaled down by a factor equal to the expected relative loss from accepting a wage that would result in either perfect quality of life or death. MWTP for an improvement in quality-of-life, as well as its bounds, decreases with quality-of-life. This implies that the value of an intervention that improves either health or longevity of a patient with a low quality-of-life (e.g., cancer or end-of-life condition) exceeds that of an intervention that benefits an individual with a better quality-of-life. Similarly, this suggests that the aggregation of expected QALY gains or losses across

the population and/or across health conditions of different severity overemphasizes the importance of minor conditions. *This working paper n°31 will be submitted early in 2019.*

- Another paper by **Daniel Herrera**, jointly with **Lise Rochaix**, provides an empirical assessment of the effects of age and health on the willingness to accept compensation for mortality risk increases by reporting the results of a compensating wage differential for occupational status fatality risk in France. The paper uses an original dataset combining respondents' health information elicited with face-to-face interviews and respondents' actual work history extracted from administrative records. We find that average VSL estimates range from 8 to 15 million euros. In addition, we find no support to the idea that people with a history of heart, respiratory, cancer, or digestive disease are willing to accept less compensation to increase their risk of dying than people without these illnesses. Results also find evidence that the age-VSL relationship is U-shaped. *This working paper n°29 will be submitted early in 2019.*

#### ***4.3.2-Evaluation of non-drug strategies***

Measuring benefits for non-drug strategies is the most challenging part of economic evaluation, as the clinical evidence is often lacking or of poor value. Yet there is an increasing demand from stakeholders to measure the value of non-drug strategies, as useful complements to drug therapies.

#### ***Social Capital and Health Interventions***

This book chapter, written jointly by **Jean Guo**, **Setti Raïs** and **Lise Rochaix**, reviews the existing literature is reviewed on social capital interventions conducted to-date which purport to promote health and which evaluate health outcomes. We discuss key features of global social capital interventions shown to be effective and provide ready-to-use recommendations for researchers and policymakers interested in designing such interventions. More prevalent social capital interventions include structured psychosocial support and peer-led support programs, but there are other innovative approaches leading to interventions that consist of investing in community art projects or incorporating technology through online platforms for health monitoring. With an increasing interest given to social capital and its impact on health, we provide the first in-depth look at low-cost interventions designed specifically to raise levels of social capital in relation to health, sharing recommendations and best practices reported in the field. *This review has been published in 2018 in the Handbook for social capital (n°20).*

#### ***Physical activity and prevention***

This research theme started with a request originally made by AP-HP regarding the value of activity programs for hospitalized patients with chronic diseases. The collaboration with **Grégory Ninot** (University of Montpellier 1), affiliated with Hospinnomics, director of the research center dedicated to the evaluation of non-drug strategies has helped secure the link with the INSERM team in charge of this evaluation. A first literature review was produced and later extended to a full contribution for an INSERM report<sup>4</sup> published in 2017. Following the report, a systematic review has been undertaken by **Marlène Guillon** (University of Montpellier 1) in charge of this research, based on published economic evaluations of exercise programs targeting patients with a chronic condition in PUBMED and JSTOR between January 1, 2008, and December 31, 2016. A total of 37 studies were selected and 60% of exercise programs were found dominant or cost-effective. For musculoskeletal and rheumatologic disorders, 72% of programs were dominant or cost-effective while this was the case for 57% of programs for cardiovascular diseases using a nonsurgical comparator. The review shows clear evidence in favor of exercise-based programs for the treatment of musculoskeletal and rheumatologic disorders and, to a lesser extent, for the treatment of cardiovascular diseases. On the other hand, more research is needed to evaluate the cost-effectiveness of physical activity in the treatment of neurological disorders, mental

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<sup>4</sup> Marlène Guillon, Jean Claude K. Dupont, Lise Rochaix, (2017) “Cost-effectiveness of interventions based on physical exercise in the treatment of chronic diseases: A systematic literature review”, Rapport INSERM 2017

illnesses, cancers, respiratory diseases, and diabetes/obesity. *This paper n°4 is published in the International Journal of Health Technology Assessment.*

### ***Decremental cost-effectiveness technologies and non-pharmacological treatments***

Initial research on physical activity has since been extended to cover a wider range of non-drug strategies, as it bridges with the work package (WP) led by Hospinnomics in the European H2020 project, which was launched in January 2018 at PSE, with **Panos Kanavos** as Principal Investigator. IMPACT-HTA's objective is to propose new and improved methods, tools and guidance for decision-makers across ten research areas in the context of HTA and health system performance measurement. **Lise Rochaix** is leader for WP11 which involves the two AP-HP research units: Hospinnomics and URC-éco. The research areas addressed in WP11 deal with two different types of technologies, namely decremental cost-effectiveness technologies and non-pharmaceutical interventions (NPIs). Although these technologies may indeed be cost-effective, there is a risk of unsuccessful development or implementation simply because the case could not be made for their medical and social value. It is therefore important to inquire into stakeholders' preferences and willingness to accept such decrementally cost-effective or non-drug interventions.

While URC-éco is conducting a systematic review of decremental cost-effectiveness technologies, researchers at Hospinnomics are reviewing the evidence published in medical journals on the clinical efficacy of non-pharmaceutical interventions (NPIs). In view of the variety of 'candidate technologies' for economic evaluation, a typology is required before carrying out the behavioral part of Hospinnomics' analysis, which aims at inquiring into stakeholders' preferences and willingness to adopt NPIs in complement, or in substitution, to drug therapies. This necessary first step will help define attributes and levels for the preference elicitation study based on a discrete choice experiment (DCE). A stakeholders' workshop, planned in June 2019, will allow to benchmark practices in EU health authorities and to pilot the DCE before running it in Fall 2019. Producing robust evidence on the clinical efficacy of NPIs is indeed challenging, as the paradigm of drugs evaluation processes requires study designs that are incompatible with the intrinsic nature of most NPIs. In a policy brief, we have identified the challenges related to the evaluation of the efficacy and the costs of NPIs by conducting a narrative literature review. The policy brief underlines the shortcomings in current papers undertaking medical and economic evaluations of NPIs and discusses the intrinsic nature of NPIs in relation to the evaluation requirements. Finally, it reviews the framework that has been proposed in the literature to conduct reliable evaluation of NPIs. *This paper n°46 will be available as a Hospinnomics policy brief.*

#### ***4.3.3 Patient/Public Involvement: from design to assessment***

When measuring and valuing benefits, the patient and the public perspectives become central. Indeed, in recent years, patient and public involvement ('patient and public involvement' – PPI) is increasingly viewed as a valuable resource. This may be at the stage of either interventions' design or evaluation. The objectives are to foster empowerment, health democracy, as well as secure social acceptability of health interventions. It can take the form of involving patients at the early stages of the research study design (*see paper n°12*) or enriching the data collected by adding patients' assessment of their health status (e.g. Patient Reported Outcomes Measures – PROMs) or their experience with care (Patient Reported Experience Measures - PREMs), or in developing technology assessments. Systematically including PPI in both research and evaluation agenda is difficult, because practices vary between countries and between clinical areas. **Jean-Claude Dupont** has developed research in this area both from an epistemological (integration of patient perspective in evidence generation) and an ethical point of view (ethically sound involvement practices), jointly with members of the French Authority for Health (HAS) and with the medical ethics unit at Paris Descartes University (*See papers 3, 8, 14, 19, 38*). For instance, a systematic inquiry is currently conducted on the evaluation procedures that have been recently adopted at HAS in order to include the patient's perspective in both clinical and economic assessments of drugs at market authorization stages. These issues have been addressed during the panel organized during the June 2018 "*Matinée du Collège des Économistes de la Santé*" on ethics and economics.

## 5. Knowledge Transfer

In this section, we draw on the concept of Knowledge Transfer and Expertise - KTE<sup>5</sup> to illustrate the dynamics that Hospinnomics is meant to encourage between decision-support and academic research. It helps identify the return on investment (ROI), not only for the share of AP-HP endowment earmarked to the production of deliverables (25%), but also for the part that funds academic research activities. Highlighting the positive externalities associated with the research part of the endowment is essential but difficult. The challenge in measuring Hospinnomics' research ROI stems, in part, from the diversity of the work carried out by the Chair, whether in the form of contributions to HTA or Health Services Research (HSR) productions, or in economic analyses of either organizational changes or individual health investment choices. Most importantly, the standard measure of research ROI at hospital level cannot be used for most health economics papers because the list of journals on which the national incentive system (called 'SIGAPS') is defined only includes clinical and public health research, and most health economics journals, including the top ones (e.g. *Health Economics or Journal of Health Economics*) are excluded. As a result, neither does Hospinnomics benefit from the important revenues generated through the French hospital research incentive scheme nor can its' research ROI be measured through the number of SIGAPS. The most important dimension of ROI for AP-HP stems however from research projects obtained by Hospinnomics under external public funding, which brings additional resources accruing to partnering AP-HP teams. Finally, ROI comes from reputational effects and the opportunity to attract expertise from a new pool of researchers in economics and social sciences.

Knowledge transfer at Hospinnomics mostly takes the form of applied research, either for impact evaluations or reform simulations, for AP-HP (Section 5.1) or for other stakeholders (Section 5.2). But it also implies engaging with the academic community (section 5.3) or with governmental bodies (Section 5.4).

### 5.1 - AP-HP priorities for impact evaluation and expertise

#### 5.1.1 – Experimenting with innovative payments

In 2018, the French government has opened the possibility for stakeholders to experiment with innovative payment schemes in the health care sector (*Article 51 of the Loi de Financement de la Sécurité Sociale*) under the condition that the purpose of the experiment is the improvement of at least one dimension of care (e.g. patient pathways coordination between primary and secondary care, efficiency, access, quality). The candidate experiments will be selected by a national strategic committee (to which **Lise Rochaix** belongs) and they will be conducted for 5 years, starting in January 2019. AP-HP has set up a specific 'Article 51 task force' in order to submit proposals, with a strong participation from Hospinnomics represented by **Christine Meyer**.

In order to provide further support, the theme adopted this year for the **technical workshop at Hospinnomics has been 'innovative payment schemes'**. This workshop brings together members from AP-HP (hospital managers, clinicians, URC-éco, Hospinnomics) together with other research units (IRDES, Université Paris V), members of the Health Ministry (DREES, ATIH), members from the social security (CNAMTS), members from the Paris regional health authority (ARS IdF) and member of the French national health board (HAS). This year, membership varied between 20 and 40 participants. In preparation of the workshop opening in October 2017, a literature review has been produced in September 2017 in French on the relevance for the French reform of the international experience with bundled payment schemes (n°45). Another review paper on quality measurement issues and the relevance of quality related payments in France is currently developed with co-authors at HAS. A comparison is made with 7 countries using quality indicators on a routine basis, whether based on

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<sup>5</sup> This notion is developed in the 2014 Hospinnomics feasibility study (see recommendation 10, in appendix 1).



process indicators or patient satisfaction indicators, such as PROMs and PREMs. This *working paper n°36* analyses the prospects for adoption of quality related payments in the framework of the French reform on optimal payment schemes announced by the current government. Finally, in relation to this topic, a special matinée has been organised by **Lise Rochaix** for the French Health Economics society (Collège des Economistes de la Santé).

### ***5.1.2 – Microsimulations of hospital Out of Pocket payments’ reform***

Out-of Pocket payments in hospitals have been identified early on by **Martin Hirsch**, AP-HP General Director, as a priority area of research for Hospinnomics. Indeed, little is known on how hospitals are reimbursed for OoP payments, in particular for patients with no supplementary health insurance. More recently, the French government has decided to reform the basis for hospital OoP payments calculation, with potentially strong impacts on hospital funding. Hospinnomics has carried out a very large and detailed study of these hospital OoP payments and produced a microsimulation program under Excel to analyze the implications of different reform scenarios. Indicators of reform feasibility (winners and losers), financial sustainability and equity (level and distribution of OoP payments across conditions) have been used to compare scenarios, both from an AP-HP perspective and a national perspective. *This study will be available as a Hospinnomics’ internal working document n° 43 and a policy brief (n°42).*

### ***5.1.3 – Evaluation of AP-HP online appointments’ scheme***

An online appointment system for outpatient consultations has been set up by AP-HP, with 90% of its implementation achieved in May 2018. Hospinnomics has been in charge of evaluating the impact of this new system on AP-HP activity, under the responsibility of **Daniel Herrera** together with **Camille Luya-Guedj**. An evaluation protocol has been defined in August 2017, with a baseline study produced in March 2018. The final evaluation will be produced in 2019 by **Rolando Leiva**. Preliminary results, based on extractions from both Doctolib and OPALE (AP-HP information system) have been presented in July 2018 and show positive effects on AP-HP activity volume.

### ***5.1.4 – Participation in AP-HP committees***

Beyond specific expertise on a number of predefined priorities, AP-HP expects Hospinnomics to take part in a number of its own activities.

- *Committee for rapid HTAs at AP-HP*

Jean-Claude Dupont has been appointed to AP-HP’s innovation commission to select projects submitted to an internal call intended to foster pilot studies on innovative medical devices.

- *Scientific and ethical committee of the AP-HP Datawarehouse*

Jean-Claude Dupont has been appointed for 4 years to the scientific and ethical committee in charge of granting access to AP-HP’s Datawarehouse, with monthly meetings.

## ***5.2 – Impact Evaluation and Expertise on External Funding***

The response to public calls for proposals has been a strong lever in bringing together the two components of the Chair’s activity (expertise and academic research). In some cases, AP-HP’s initial requests for expertise contained a genuine research dimension or required more resources than those earmarked to the decision-support activity. As a result, they were redirected into requests for public funding. Public funding has enabled quantitative and/or qualitative expertise, which in most cases will lead to academic publications.

### *5.2.1 – Ongoing projects*

#### *A - Intensive case management in occupational accidents*

This program (EVALCASE) was funded by the French national health insurance board (CNAMTS) to evaluate the impact of intensive case management for severe occupational accidents on their temporary and permanent work incapacity, as well as their treatment costs. A pilot program of case management for patients with severe occupational accidents was conducted in 5 health insurance districts (CPAM) in France. The treated sample was identified in the national health insurance database. A control group was then selected in this same database using a combination of Coarsened Exact Matching (CEM) and propensity scores, in order to obtain balanced samples on all control variables. Results after a one-year follow-up were estimated using a parametric model with these control variables. Compared to a control patient, a patient who benefited from case management spent on average 22 days more out of work in the year following the accident (95% CI: [13; 31]). The proportion of patients with a permanent incapacity one year after the accident was 2.7 times higher in the treated group than in the control group (95% CI: [2.3; 3.1]). Treatment costs per patient over the year following the accident were 4 569 € higher with case management (95% CI: [3 774 €; 5 363 €]). The program led to an increase in both temporary and permanent work incapacity measures, as well as to higher treatment costs during the first year. While the longer sick leave duration may contribute to avoiding relapses in the long-run, the higher permanent incapacity is probably due to the fact that the work capacity evaluation was carried out by the doctor involved in the case management of the patient. The original methodology developed to identify a control group may be replicated for other evaluations, especially when randomization is excluded. This impact assessment was initially aimed at producing a report for CNAMTS internal use and it has been produced by **Noémie Kiefer** in April this year. However, since then, a paper ([working paper n°33](#)) has been drafted and will be sent to the Journal of Occupational Research early in 2019. This project illustrates the potential of transforming stakeholders' issues into academic publications.

#### *b - Online therapeutic education*

One of Hospinnomics' public funding applications was with the PRME (Medico-Economic Research Program) from the French Health Ministry. This project, named **PIC-R** aims at evaluating the cost-effectiveness of therapeutic education using an internet platform in renal diseases. It has been initiated by a physician from AP-HP, **Evangéline Pillebout** and involves researchers from Hospinnomics (**Noémie Kiefer**) and J-Pal (Poverty Action Lab) Europe (**Luc Behaghel and Clément de Chaisemartin**), with a joint research assistant (**Maria Porras**). This project, carried out in collaboration with **Isabelle Durand-Zaleski** (URC-Eco), illustrates the ability to bring together the interests of multidisciplinary academic researchers (J-Pal, France Telecom, Léon Bérard Center for Cancer in Lyon, etc.) and those of clinicians wishing to evaluate an original intervention providing online patient therapeutic education in hospitals, through the use of a community interactive platform. The design of the study, based on a Randomized Control Trial (RCT) involves major regulatory and logistical hurdles, which have been overcome for the most part since all investigating centres are now opened.

#### *c – Ambulatory surgery for endometrial cancer*

This research program (**AMBU-ENDO**) has been initiated by a clinician from AP-HP, **Geoffroy Canlorbe** and is carried out at Hospinnomics by Maria Porras, with the collaboration of affiliates (Jean-Michel Josselin, University of Rennes 1 and Valérie Clément, University of Montpellier 1, in collaboration with **Isabelle Durand-Zaleski** (URC-Eco). The main objective of this study is an economic evaluation, as required by the 'PRME', and is placed under Hospinnomics' scientific responsibility. In addition to evaluating the cost-effectiveness of ambulatory surgery versus hospitalisation in endometrial cancer, patients' and professionals' preferences will be analysed in this project. Hospinnomics has delivered the discrete choice experiment to be run in 2019 in the investigating centres in this RCT.

#### *d - Social robots in long term care*

This project (ROSIE) has been initiated by GEROND'IF, a network of gerontology centres in the Paris region, coordinated by AP-HP. The aim of the project is to make a state-of-the-art analysis of the use

and experimentation of social robots in gerontological and long-term care in France. Hospinnomics' intervention in this project is methodological; in cooperation with **Benoit Dervaux** (CHU Lille), Hospinnomics will offer guidance on adapting the standards of economic evaluation methods to the special features of these medical devices, patient populations, and care environments. As the economic evidence on social robots is scarce, this guidance will mainly rely on consensus-building methods with stakeholders.

#### *e – Telehealth for organ donors*

This evaluation project (CRISTALIMAGE), under the responsibility of **Isabelle Durand-Zaleski** (URC-Eco), is a telehealth project set up by the French agency in charge of organ allocation (ABM). It allows real-time visualization of donor organs' imaging for transplant teams. URC-éco is in charge of the economic evaluation of this project while Hospinnomics is in charge of designing an ancillary study on the preferences of the involved professionals, based on the Best-Worst Scaling method. This complementary study will generate evidence on the drivers but also the hurdles to be expected for an appropriate use of the technology by transplant teams in their decisions on organ procurement.

#### *f - Genetics of paediatric malign hemopathies*

This project (PAIR-AML) is funded by the National Cancer Institute (INCa) and aims at fostering cooperation between life sciences and social sciences in cancer studies. This project has been initiated by a clinician from AP-HP, **Arnaud Petit**, on the genetics of paediatric malign hemopathies (AML). Hospinnomics' involvement is mostly ethics-oriented, under **Jean-Claude Dupont**'s responsibility, using qualitative methods. But a future direction may involve identifying and characterizing the effective supply of genetic counselling in France. This first descriptive approach may therefore offer opportunities for a future joint application for a PRME led by Hospinnomics.

### *5.2.2 – Responses to public calls*

AP-HP expects Hospinnomics to respond to **public calls**, and 12 applications were submitted over the report period. Of those which were rejected, 2 were applications for the setting up of large research units led by AP-HP clinicians (*Institut Hospitalier Universitaire -IHU-*) at St Louis hospital (THEMA) and Hôtel-Dieu hospital (CHRONI-CITÉS); 2 projects were related to paediatric oncology (BeSPOH-PDX, submitted to INCa SHS call and SUPRAHero, submitted as an EU H2020 project); 1 application was led by the nurse research unit at AP-HP (CRIC, submitted to PHRiP); 2 applications were research application to IRESP using Constances panel (CONSTANCES-INNOV) and to DARES (Hospi-RPS). Answers are still expected from public funders for 4 applications (PRME, IRESP, H2020, ANR).

### *5.3 – Engagement with the academic community and the public at large*

Hospinnomics has organised invitations for PSE's weekly behavioural seminar, with **Audrey Laporte** (Toronto university) during her two visiting stays (May and October/November 2018) and **Randall Ellis** (Boston University, May 17<sup>th</sup>, 2018).

Engagement with the academic community took various forms, the most significant being the organization of the **18<sup>th</sup> European Health Economics Workshop (EHEW)** at PSE on May 18<sup>th</sup> and 19<sup>th</sup>. This event brought together theoreticians in health economics, with a restricted number of attendants and was based on a system of discussants, giving a full hour to each paper presented. It was attended by junior members and provided a vehicle for Hospinnomics' training. It also strengthened the connection between the PSE research community and theoreticians in health economics in Europe.

**An international workshop**, organized jointly by Hospinnomics and IRDES, has taken place at AP-HP (Hotel Scipion) on September 5<sup>th</sup>, on "Why and how to reduce variations in medical practice?" .

It is at the European Health Economics Association conference in Maastricht in July 2018 that **Lise**

**Rochaix** became the **EuHEA**'s president for a mandate of 2 years, after 2 years as president elect. The priorities defined for this two year mandate are 1) to strengthen the theoretical foundations of research in health economics. An example of possible actions in this respect is the development of interactions between members of the EHEW network and EuHEA; 2) to strengthen the interactions with other disciplines. An example of possible actions in this respect is the organization of a EuHEA invited session on hospital efficiency at the European Association of Hospital Managers annual congress in Lisbon in September 2018. At national level, Lise Rochaix is a member of the editorial board of the newly revised *Journal de Gestion et d'économie médicale*. She is on the board of the French health economics association (CES), a member of the **Scientific Committee of IRDES** and of the **Journées de l'Economie** (JECO). This year, Lise Rochaix co-organized the JECO panel on 'Economic calculus applied to social policies' and was a panelist for the session on 'the price of innovative drugs'.

**Jean-Claude K. Dupont** has joined the research unit "ETHics REsearch Translations" (ETRE) at Paris Descartes University (Paris V medical school). This research unit is led by Pr. **Marie-France Mamzer** (Paris V), focusing on research ethics, translational research and medical ethics and epistemology. JCKD taught an "ethics and economics" module in the M2 'ethics' curricula.

For the second year, JCKD has been invited to join the **scientific committee of a research call on Health Services Research** held by the French Public Health Research Institute (IRESP). The committee is in charge of reviewing and selecting the relevant expressions of interest and then the successful research projects. Like PRME, PREPS and PHRC are two hospital research calls held by the French Ministry of Health. In 2018, JCKD has been invited to report on one project for the third year. AP-HP receives a monetary compensation (MERRI) for this expertise.

Hospinnomics co-organised two "**Matinées du Collège des Economistes de la Santé**", with more than 80 participants on both occasions. The first matinée set up at AP-HP (hôtel Scipion) by **Lise Rochaix**, jointly with **Julien Mousquès** (IRDES) was on innovative payment schemes and 'Article 51', as a follow-up of Hospinnomics' technical workshop. The second matinée was organized by **Jean-Claude Dupont**, jointly with **Clémence Thébaut** (IAE Limoges), on ethics of economics research in health, in relation to the current revision of the bioethics laws in France.

Finally, one of the most natural ways to engage with the public at large is to produce a **Massive Online Open Course** (MOOC). Hospinnomics has produced the first MOOC in health economics in French and it was released on the FUN (*France Université Numérique*) platform. The course run between June 4th and ended on July 31<sup>st</sup>, with 3995 registrations. Of those who completed the course (636 certificates), 46% were in the medical profession, 42% had never done economics before, 88% said they satisfied or very satisfied and thought they would probably use the course knowledge in their professional activity. The MOOC will be placed on Hospinnomics' website in January 2019 and made freely available to all in January 2019.

#### **5.4 – Engagement with the public policy community**

This year, engagement with the public policy community either arose from national and international issues, such as innovative provider payments schemes or from stakeholders' issues, such as out-of-pocket payments reforms and their impact on AP-HP or nationally.

**Lise Rochaix**'s mandate as chair of the board of the national agency for hospital information (Agence Technique pour l'Information Hospitalière) has been renewed for three years. Other mandates include the Committee for national accounts or the national conference for health. She has been appointed to national committees in relation to the current **health care systems' payment reform**: 1) the strategic committee for innovation in health; 2) the scientific committee of the task force on payments' reforms; 3) the committee in charge of evaluating large investment projects in health. Lise Rochaix has also engaged with the *Secrétariat général pour l'investissement* (SGI) the forecasting division of the Prime minister's office (*France Stratégie*) and in order to encourage the use of economic calculus, with a special responsibility for health. She collaborates with **Daniel Herrera** and **Quitterie Roquebert-**

**Labbé** and jointly produced a working paper (n°47) on the use of economic calculus in hospitals investment projects. This working paper has benefited from comments from AP-HP managers.

**Jean-Claude K. Dupont** has been appointed **vice-president of the Committee for economic evaluation and public health (CEESP)** of the French Authority for Health (HAS), after his renewal for a 3-year mandate. CEESP has been founded by Lise Rochaix when she was on the Board of the French Authority for Health (HAS). CEESP is in charge of public health recommendations issued by HAS and of the economic assessment of drugs at market authorization (under eligibility criteria). Jean-Claude K. Dupont is involved in two working groups at HAS: 1) ‘Value of Information for medical devices’; 2) Validation of new diagnostic indications for next generation sequencing (NGS). A Plan *Genomic Medicine 2025* has been released in 2016; it aims at establishing access to genetic diagnosis in France through the establishment of eleven sequencing platforms. Two pilot platforms will run in 2019, in Paris and in Lyon regions. The HAS has been commissioned to enforce the 6<sup>th</sup> measure of the Plan intended to “establish a system for the assessment and validation of new indications”; this measure also has a dimension related to the human and social sciences. The HAS has convened a working group to which Jean-Claude K. Dupont takes part, as well as **Lionel Perrier** (health economist, Centre Léon Bérard, Lyon). Among others, the group has to establish methodological guidelines for the economic evaluation of candidate indications, including an assessment of relevant ethical aspects.

## 6. Publications & Presentations

### 6.1 – Publications

#### 1 - Articles Published in Peer-Reviewed Journals

1. **Barrenho E., Miraldo M., Smith PC.** Does global drug innovation correspond to burden of disease? The neglected diseases in developed and developing countries. *Health Economics*. 2018;1– 21. <https://doi.org/10.1002/hec.3833>
2. **Cavalan Q., Hazan M., Hu I., Zighed R.,** “Prices, Patents and Access to Drugs: Views on Equity and Efficiency in the Global Pharmaceutical Industry”, *Revue Française des Affaires Sociales*, 2018 (Accepted for publication in the Special Issue "Regulating pharmaceutical prices")
3. **Clément V., Raimond V.,** (2018) “Was it worth introducing health economic evaluation of innovative drugs in the French regulatory setting? The case of new Hepatitis C drugs”, *Value in Health* (in press)
4. **Guillon M., Rochaix L., Dupont JCK,** (2018) “Cost-effectiveness of interventions based on physical activity in the treatment of chronic conditions: a systematic literature review”, *International Journal of Health Technology Assessment in Health Care*, Oct 9:1-17
5. **Hammitt J., Herrera-Araujo D.,** (2018) “Peeling back the onion: using latent class analysis to uncover heterogeneous responses to stated preference surveys” *Journal of Environmental Economics and Management*, vol. 87(C), pages 165-189
6. **Marks S., Kumpel E., Guo J., Bartram J., Davis J.,** “Pathways to sustainability: A fuzzy-set qualitative comparative analysis of rural water supply programs”, *Environmental Science & Technology*, 2018.
7. **Rachet Jacquet L., Toulemon L., Raimond V., Degrossat-Théas A., Rochaix L., Paubel P.,** « Le prix des médicaments en France. Note synthétique sur les évolutions récentes du système français de fixation des prix », *Revue française des affaires sociales*, 2018 (Accepted for publication in the Special Issue "Regulating pharmaceutical prices")
8. **Raimond V., Cléa Sambuc, Leslie Pibouleau,** (2018) “Ethics Evaluation revealing Decision-Maker Motives: a case of neonatal screening”, *International Journal of Technology Assessment in Health Care*, 34:2, 1–7
9. **Raïs Ali S., Raimond V., Degrossat-Théas A., Rachet-Jacquet L., Rochaix L., Lu X., Paubel P.,** ‘Early Access Programs and pricing strategy: a case study on cohort Temporary Authorization for Use in France from 1994 to 2016’, *Revue française des affaires sociales*, 2018 (Accepted for publication in the Special Issue "Regulating pharmaceutical prices")
10. **Roquebert Q., Tenand M.,** "Pay less, consume more? Estimating the price elasticity of demand for home care of the disabled elderly", *Health Economics*, 2017, 2017 26(9), p. 1162-1174.
11. **Roquebert Q., Roméo Fontaine, Agnès Gramain** « Aider un parent âgé dépendant. Configurations d'aide et interactions dans les fratries en France.» *Population*, 2018, 73(2) p. 323-350.
12. **Surun A, Dujaric MÉ, Aerts I, Orbach D, Jiménez I, Pacquement H, Schleiermacher G, Bourdeaut F, Michon J, Dupont JCK, Doz F,** (2018) “Enrollment in early-phase clinical trials in pediatric oncology: The experience at Institut Curie”, *Pediatric Blood and Cancer*, May;65(5).

13. **Toulemon L.**, "The Effect of Group Purchasing on Prices Hospitals Pay for Medicines", *Health Economics*, 2018, Volume 27, Issue 9, <https://ideas.repec.org/p/hal/wpaper/hal-01659176.html>

## 2 - Publications in Professional Journals

14. **Dupont JCK**, Thébaut C., Wittwer J., "Éthique et économie de la santé : quels enjeux actuels ? ", *La lettre du Collège des économistes de la santé*, Nov. 2018.
15. **Marsaudon A.**, "Les chocs de santé affectent-ils la stabilité des traits de personnalité ?", billet sur le blog de l'Association Française des Sciences Economiques (AFSE), Août 2018.
16. **Marsaudon A., Rochaix L.**, « Survenue d'un problème de santé : quel impact sur la consommation de tabac ? », Paris School of Economics, 5 articles in 5 minutes.
17. Long-term Impact of Job Displacement on Job Quality and Satisfaction: Evidence from Germany – **Toulemon L.** et Weber-Baghdiguian L., Paris School of Economics, 5 articles in 5 minutes.
18. **Toulemon L.**, Weber-Baghdiguian L., La fabrique de l'industrie, "Licenciement et qualité de l'emploi en Allemagne", Commentaire sur l'article "Parcours de travailleurs dans une économie mondialisée", d'Eugénie Tenezakis et Philippe Frocraïn, *Note de la Fabrique de l'industrie*, 29 mai 2018.

## 3 – Book Chapters

19. **Dupont JCK**, "Le principe de proportionnalité dans l'évaluation économique des technologies de santé", in *La proportionnalité en santé*, in *Carnets de l'Espace de réflexion éthique de Bretagne*, Sauramps Médical, Montpellier, déc. 2018
20. **Guo J., Raïs Ali S., Rochaix L.**, Social capital and health interventions: Enhancing social capital to improve health, *Elgar Companion to Social Capital and Health* - Chapter 11, 2018

## 4 – Articles Accepted or in Revision in Peer Reviewed Journals

21. Barnay Th., **Marsaudon A., Rochaix L., Sanchez M.A.**, "L'influence des accidents de la route sur les trajectoires professionnelles des personnels en fin de carrière, à partir de la cohorte Gazel." Revise and Resubmit, *Revue d'Economie Politique*.
22. Béranger A., Bouazza N., Haut de Sigy A., Foubert-Wenc A.C., Davous D., Aerts I., Geoerger B., Auvrignon A., Brethon B., Pierre Leblond, Nadège Corradini, Nicolas André, Hélène Martinez, **Dupont J.C.K.**, Doz F., Chappuy H., (2018) "Parents' and children's comprehension and decision in early phase oncology trial in pediatric: a prospective study", *Archives of Diseases in Childhood*, accepted, in nov-dec issue.
23. **Raïs Ali S.**, Tubeuf S., (In)equality of opportunity in the allocation of R&D resources for rare diseases. Revise and Resubmit, *Social Justice Research*.
24. **Raïs Ali S.**, Sandy Tubeuf. Seuil d'acceptabilité des technologies de santé : quel retour d'expérience 20 ans après ? PSE Working Paper n°2018-20. 2018. Revise and Resubmit, *Les annales des Mines – Gérer et Comprendre*.

## 5 - Articles Submitted

25. **Marsaudon A.**, Thuilliez J., "Does democracy reduce the HIV epidemic? Evidence from Kenya", Submitted, *Journal of African Studies*.
26. **Marsaudon A., Rochaix L.**, "Impact of acute health shocks on lifestyles, Evidence from the French Gazel panel data". PSE Working Paper n°2017-47. 2017, Submitted, *Health Economics*

27. **Proshin A., Cazenave-Lacrouz A., Rochaix L.**, ‘Impact of Tariff Refinement on the Choice Between Scheduled Cesarean Section and Normal Delivery: Recent Evidence from France’, submitted to the Journal of Health Economics.

## 6 – Working Papers

28. Barrenho E., **Halmi R.**, Miraldo M., **Raïs Ali S., Rochaix L., Toulemon L.**, Measuring inequalities in cancer drug development in terms of unmet medical need.
29. **Herrera D., Rochaix L.**, "Does the Value per Statistical Life Vary with Age and Health? Evidence from a compensating wage study in France".
30. **Herrera D., Rochaix L.**, "Revisiting the Health Care Public-Private mix: Is Public Maternity Provision in France Correcting for Market Failures or Displacing Private Care?".
31. **Herrera D., Hammitt J.K., Rheinberger C.**, "One Wedding and One Funeral: On the Value of a QALY".
32. **Herrera D., Piechucka J.**, "Impact of Mergers on product repositioning: Evidence from the French Hospital Industry".
33. **Rochaix L., Kiefer N. and Leiva R.**, Impact on Work Incapacity and Treatment Costs of Intensive Case Management after Severe Occupational Accidents: Evidence from Administrative Insurance Data in France
34. **Raïs Ali S., Dourgnon P., Rochaix L.**. Social Capital or Education: What Matters Most to Cut Time to Diagnosis? PSE Working Papers n°2018-01. 2018.
35. **Raïs Ali S.**, European initiatives to foster R&D in rare diseases arenas: The Orphan Drug legislation in 18 years.
36. **Rochaix L.**, le Borgès E., Grenier C., May L., ‘De la mesure de la qualité à son usage dans la regulation des systems de santé.
37. **Roquebert Q., Kaboré R., Wittwer J.**, “Decentralized policies and formal care use by the disabled elderly » PSE Working paper n°2018-47. 2018 ; <https://halshs.archives-ouvertes.fr/halshs-01877829>
38. Thébaut C., Sambuc C., **Dupont J.C.K.**, “Methods for assessing ethical aspects at the French National Authority for Health.”, Corrections demandées par le International Journal of *Technology Assessment in Health Care*.
39. **Toulemon L., Weber-Baghdiguian L.**, “Long-term Impacts of Job Displacement on Job Quality and Satisfaction Indicators: Evidence from Germany”, version en ligne: <https://ideas.repec.org/p/hal/wpaper/halshs-01418183.html>
40. **Toulemon L., Rachet Jacquet L.**, The list of supplementary medicines in hospitals: which impacts on volumes?
41. **Tzintzun I.**, Heterogenous peer effects in body weight, physical activity and dietary choices: does type of peers matter?

## 7 – Hospinnomics Policy Briefs and internal working papers

42. **Fournier C., Meyer-Meuret C.**, Les restes à charge (Recto-Verso n°12)
43. **Fournier C., Meyer Meuret C., Rochaix L.**, ‘Les reste à charge hospitaliers’
44. **Marsaudon A., Rochaix L.**, Impact d'un choc de santé sur les styles de vie (Recto-Verso n°10)
45. **Rachet-Jacquet L., Rochaix L., Sanchez M.A.**, ‘Revue de la littérature en vue de l’expérimentation de nouveaux modes de tarification à l’hôpital : le paiement à l’épisode de soins, September 2017
46. **Raïs S., Ninot G., Leiva R., Rochaix L., Dupont J.C.K.**, ‘Methodological challenges in the evaluation of Non Pharmaceutical Interventions’



47. **Roquebert-Labbé Q., Gastaldo S., Baumstark L., Rochaix L.**, Evaluation socio-économique des investissements immobiliers hospitaliers : état des lieux et pistes de travail.
48. **Toulemon L.**, Les groupements d'achat (Recto-Verso n°11)
49. **Marsaudon A.** Do Health Shocks Modify Personality Traits? Evidence from Locus Of Control. PSE Working Papers n°2019-02. 2019. <halshs-01976868>
50. **Marsaudon A., Machado S. Galizzi M.**, Impact of Health shocks on risk tolerance: no evidence of impact from UK panel data.

## 8 – Hospinnomics' publications in academic journals (before September 2017)

1. **Daniel Herrera-Araujo**, Sally Shaywitz, Bennett Shaywitz, Marchione, Karen E. & Michaels, Reissa and John Holalan, James K. Hammitt, (2017) "Willingness to pay: a novel approach to assessing the impact of dyslexia in adults", *Journal of Benefit Cost Analysis*, vol. 8 (01), pages 24-48, March.
2. Christoph Rheinberger, **Daniel Herrera-Araujo**, James K. Hammitt, (2016) "The value of disease prevention vs treatment", *Journal of Health Economics*
3. **Daniel Herrera-Araujo**, (2016) "Folic Acid Advisories: a public health challenge?" *Health Economics*, vol. 25, pages 1104-1122.
4. François Doz, **Jean-Claude K. Dupont**, Kathy Pritchard-Jones, (2016) "Ethical issues of clinical trials in paediatric oncology: A systematic review over 10 year developments (2003-2013)", *Lancet Oncology*.
5. **Véronique Raimond**, Fabienne Midy, Clémence Thébaut, Catherine Rumeau-Pichon, (2016) "L'évaluation économique des produits de santé innovants : quelle interprétation pour quel usage ?", *Revue française des affaires sociales* 2016/3 n° 7 | pages 263 à 281
6. **Jean Guo**, Sara Bolivar-Wagers, Nivedita Srinivas, Marisa Holubar, and Yvonne Maldonado, (2015) "Immunodeficiency-related vaccine-derived poliovirus (iVDPV) cases: a systematic review and implications for polio eradication.", *Vaccine* 33, no. 10: 1235-1242.
7. Fabienne Midy, **Véronique Raimond**, Clémence Thébaut, Cléa Sambuc, Catherine Rumeau-Pichon, (2015) "Avis d'efficience relatifs aux produits de santé à la HAS : bilan et perspectives", *Santé Publique*, 2015/5 Vol. 27 | pages 691 à 700
8. Laurent Davezies, **LéaToulemon**, (2015), "Does moving to a system with a more generous public health insurance increase medical care consumption?", *Annals of Economics and Statistics*
9. **Véronique Raimond**, Jean-Michel Josselin and **Lise Rochaix**, (2014), "HTA Agencies Facing Model Biases: The Case of type-2 diabetes", *Pharmacoeconomics*, 32: 825-39.
10. **Lise Rochaix**, (2015) "Incorporating cost-effectiveness analysis into comparative-effectiveness research: the French experience", *Health Affairs blog*
11. Wheelock, A. Parand, B. Rigole, A. Thomson, **Marisa Miraldo**, C. Vincent, N. Sevdalis, (2014) "Socio-psychological factors driving adult vaccination: a qualitative study", *PLoS One* 2014 Dec 9;9 (12):e113503. doi: 10.1371/journal.pone.0113503
12. Wheelock, **Marisa Miraldo**, A. Parand, C. Vincent, N. Svedalis, (2014) "Journey to vaccination: a protocol for a multinational qualitative study", *BMJ Open*, 2014;4:e004279 doi:10.1136/bmjopen-2013-004279
13. R. Refoios, C. McGrath, **Marisa Miraldo**, et al., (2013) "The Determinants of Cost-Effectiveness Potential: An Historical Perspective on Lipid-Lowering Therapies", *Pharmacoeconomics*, 31, 1170.
14. RR Camejo, C McGrath, F Rutten, **Marisa Miraldo**, (2013) "Distribution of health-related social surplus in pharmaceuticals: an estimation of consumer and producer surplus in the management of high blood lipids and COPD", *European Journal of Health Economics*, 15, 439-45

## 9 – Hospinnomics’ publications in professional journals or book chapters (before September 2017)

1. **Antoine Marsaudon** et Lise Rochaix, (2017) “Survenue d'un problème de santé : impact sur la consommation de tabac”, Journal d'information de la cohort Gazel, Juillet 2017, n°56.
2. **Jean-Claude K. Dupont**, (2017) “Les enjeux d’évaluation du numérique dans le soin”, in Danièle Brun, ss. dir., *Tous connectés, le numérique et le soin*, Paris, janvier 2017.
3. **Antoine Marsaudon** et Josselin Thuilliez, (2016) “Les liens entre régime politique et lutte contre le VIH/SIDA: le cas du Kenya”, billet sur le blog de l’*Association française des sciences économiques (AFSE)*, octobre 2016.
4. Patricia Blanc, François Doz, **Jean-Claude K. Dupont**, (2016) “Le développement de nouveaux médicaments en oncologie pédiatrique (aspects éthiques et industriels)”, *La revue du praticien*, janvier 2016.
5. **Martin Hirsch**, **Lise Rochaix**, (2015) “L’hôpital du futur” (lettre de PSE et The conversation), novembre 2015.
6. **Jean Guo**, **Setti Rais**, **Lise Rochaix**, (forthcoming in 2017) “Social Capital Interventions and Health”, to be published in the Handbook of Social Capital and Health)
7. Jean Michel Josselin, **Laurie Rachet-Jacquet**, **Véronique Raimond**, **Lise Rochaix**, (2017) “Drug Price Regulation”, *Encyclopedia of Law and Economics*
8. Marlène Guillon, **Jean Claude K. Dupont**, **Lise Rochaix**, (2017) “Cost-effectiveness of interventions based on physical exercise in the treatment of chronic diseases: A systematic literature review”, Rapport INSERM 2017.
9. **Jean Claude K. Dupont**, François Doz, (2017) “La notion de personne dans la médecine personnalisée”, in Gateau V., Doz F., Amiel P., *Essais précoces en cancérologie, éthique et justice*, Paris, mars 2017
10. **Eliana Barrenho**, **Marisa Miraldo**, (2016) “R&D in pharmaceutical markets: measuring innovation and its determinants”, Health Econometrics in Contributions to Economic Analysis, edited by Francesco Moscone and Badi Baltagi (to be published by *Emerald Publishing 2016*)

## 6.2 – Presentations (September 2017 – November 2018)

1. J.-C. K. Dupont, invited conference, symposium on “Ethical issues in paediatric cancer”, SIOP annual Congress, Washington, oct. 2017
2. J.-C. K. Dupont, « Apports des SHS à l’évaluation d’interventions », 19èmes Journées Annuelles de la Société Française pour la Santé de l’Adolescent et du Diplôme Inter-Universitaire Médecine et Santé de l’Adolescent, Amiens, déc. 2017
3. J.-C. K. Dupont, « La recherche en chirurgie ambulatoire : l’économie appliquée à la santé »- DIU en chirurgie ambulatoire, Pr. H.-J. Philippe, Hôpital Cochin, mars 2018 - DIU en recherches paramédicales, Dr. C. Legrand, AP-HP siège, avril 2018
4. J.-C. K. Dupont, « les limites de l’évaluation », séminaire *Soin et compassion*, Chaire de Philosophie AP-HP-ENS, Hôtel-Dieu, avril 2018
5. J.-C. K. Dupont, C. Thébaut, J. Wittwer, organisation de la Matinée du Collège des économistes de la santé sur « Éthique et économie de la santé : quels enjeux actuels ? Contribution aux débats menés à l’occasion des États généraux de la bioéthique 2018 », Université Paris Dauphine, 21 juin 2018
6. J.-C. K. Dupont, « Le principe de proportionnalité dans l’évaluation économique des technologies de santé », colloque de l’Espace de réflexion éthique de Bretagne (EREB) *La proportionnalité en santé*, Brest, 29 juin 2018.
7. D. Herrera-Araujo, Collège des Économistes de la Santé, (Paris, 2018)
8. D. Herrera-Araujo, Workshop on *Environmental Economics and Natural Resources*, (Rennes, 2018)

9. D. Herrera-Araujo, 9th European Health Economics Workshop, (Paris, 2018)
10. D. Herrera-Araujo, Society for benefit cost analysis, (Washington, 2018)
11. D. Herrera-Araujo, 67th International Congress of the AFSE (Paris, 2018)
12. D. Herrera-Araujo, Journées de l'économie (Lyon, novembre 2017)
13. D. Herrera-Araujo, Journées des Economistes de la Santé Français (JESF), (décembre 2017)
14. D. Herrera-Araujo, Health Econometrics and Data Group, Prague, sept 2017)
15. D. Herrera-Araujo, 4<sup>th</sup> European Health Economic Association PhD Student-Supervisor (Lausanne, September 2017).
16. D. Herrera-Araujo, 39e Journées des Economistes de la santé français (Marseille 2017)
17. A. Marsaudon, Health Economists' Study Group (London, 2018).
18. A. Marsaudon, 2nd Journée doctorale du LIRAES (Paris, 2018).
19. A. Marsaudon, Doctorissimes - Paris 1 University (Paris, 2018).
20. A. Marsaudon, 9th Australasian Workshop on Econometrics and Health Economics (Australia, 2018).
21. A. Marsaudon, 67th International Congress of the AFSE (Paris, 2018).
22. A. Marsaudon, Work in Progress - PSE Seminar (Paris, 2018).
23. A. Marsaudon, 9ème Ecole Thématique CNRS Evaluation des Politiques Publiques (Aussois, 2018).
24. A. Proshin, Work in Progress Labor Seminar, PSE (Paris, 2017)
25. A. Proshin, Warwick Phd Conference 2018
26. A. Proshin, Canadian Economics Association Conference (Montréal, 2018)
27. A. Proshin, International Association for Applied Econometrics Conference (Montréal, 2018)
28. S. Raïs, 5th EuHEA-PhD conference, Catania (2018)
29. S. Raïs, European Health Economics Association (EuHEA), Maastricht 2018
30. S. Raïs, PSI PSE Seminar, Paris, oct. 2018
31. S. Raïs, 67th International Congress of the AFSE, Paris, April 2018
32. S. Raïs, Work in Progress - PSE Seminar, Paris, mars 2018
33. L. Rochaix, CNOM annual conference, October 2017
34. L. Rochaix, Journées de l'Economie, Lyon, Nov. 2017
35. L. Rochaix, HAS Annual conference, Nov. 2017
36. L. Rochaix, Congrès de pneumologie, Lyon, Janvier /2018
37. L. Rochaix, Conférence de l'association des directeurs hospitaliers IdF, March 2018
38. L. Rochaix, France Stratégie, March 2018
39. L. Rochaix, Matinée du CES, April 2018
40. L. Rochaix, conference cycle, public policy evaluation, PSE, May 2018
41. L. Rochaix, Cour des Comptes, June 2018
42. L. Rochaix, Colloque annuel MG-France, June 2018
43. L. Rochaix, 10<sup>ème</sup> journées du Journal de Gestion et d'économie médicale, June 2018
44. L. Rochaix, 12th European Health Economics Association (EuHEA), Maastricht 2018
45. L. Rochaix, Entretiens Enseignants Entreprises, Ecole Polytechnique, August 2018
46. L. Rochaix, 5th EuHEA-PhD conference, Catania, sept 2018
47. L. Rochaix, European Conf. of Hospital Managers association, Portugal, sept. 2018
48. L. Rochaix, Journées de l'Economie, Lyon, Nov. 2018
49. Q. Roquebert, 39e Journées des Economistes de la santé français (Marseille 2017)
50. Q. Roquebert, 67th Annual Meeting of the l'Association française de Science Economiques (Paris, 2018)
51. Q. Roquebert, 12th EuHEA conference, Maastricht 2018
52. Q. Roquebert, 5th International Conference on Evidence-based Policy in Long-term Care (Vienne, 2018)
53. M.A. Sanchez, 39e Journées des Economistes de la santé français (Marseille 2017)

54. L. Toulemon, External seminar, Groupe d'Analyse et de Théorie Economique, Lyon, janv 2018
55. L. Toulemon, Health Econometrics and Data Group, Prague, sept 2017)
56. L. Toulemon, 5th EuHEA-PhD conference, Catania, sept 2018

## 7. Staffing & PhD Students

### 7.1 – Staffing

This year, **Christine Meyer** joined Hospinnomics to work on some of the stakeholders' initiated priorities, such as hospital out-of-pocket reforms or innovative payment schemes. Senior researchers have joined Hospinnomics' network this year to take an active part in the leadership of research in specific areas. **Izabela Jelovac**, senior researcher at CNRS (GATE, Lyon 2 university) is now in charge of research on drug pricing. **Valérie Clément** and **Marlène Guillon**, lecturers at Montpellier 1 university are in charge of the research on benefits measurement. **Philippe Mossé**, senior researcher at LEST, AMSE, is in charge of research on access to hospital services, in particular emergencies. **Antoine Nebout** (INRA) is in charge of research on behavioral economics.

Hospinnomics also hired research support staff. **Maria Porras** joined Hospinnomics as a project-manager, working on PIC-R and several other projects (esp. AMBU-ENDO, ROSIE); Maria is part-time with the J-PAL. Master degrees (M2) were hired as research assistant: **Estelle Le Borgès** on the MOOC (till Aug. 18), **Rolando Leiva** on IMPACT-HTA and on the A&E project (from sept. 18); **Lorène Jacoud** is part time research assistant since Feb. 18 on the CRISTAL-IMAGE project (till nov. 19, part-time student at École Normale Supérieure). **Candice Fournier** stayed from Sept. 17 to July 18 as part-time research assistant following her internship (summer 17); she worked with Christine Meyer on the hospital Out of Pocket study. Interns also worked at Hospinnomics during the last year: **Camille Luya-Guedj** (6M Hospinnomics intern, 6M AP-HP intern, on the PRDVEL project), **Rolando Leiva** (6M Hospinnomics intern), **Reka Halmi** (4M Hospinnomics intern, INCa project), **Olivier Supplisson** (2M Hospinnomics intern, A&E project), and **Léa Dumoulin** (M1, 6 weeks intern). **Bastien Tourenc** has newly been hired as a research assistant in nov. 19 (Physical Activity project).

### 7.2 - Training and mentorship

We are thankful for the high quality of the contributions of those who joined Hospinnomics, whether for a short or a long period and we are very proud of their respective achievements. **We feel that this demonstrates our commitment to provide significant value in training and mentorship.**

#### 7.2.1 - Completed Post-docs

After two years at Hospinnomics as post-doctoral fellows, **Daniel Herrera** has been appointed lecturer at Paris Dauphine and **Lea Toulemon** research assistant at the Institute of Public Policies (IPP) at PSE.

#### 7.2.2 - PhDs

- **Véronique Raimond** completed her PhD on December 20<sup>th</sup>, 2017 at Paris 1 university and has now a senior position at the French National Health Board (HAS). Her thesis title is 'Pharmaceutical market regulation in France: contributions of socio-economic calculation'; Supervisors: Lise Rochaix and Jean-Michel Josselin (Rennes University); external referees: Sandy Tubeuf, Jérôme Wittwer; Chair: Catherine Le Galès, other thesis committee members: Hélène Huber, Luc Baumstark, Catherine Rumeau-Pichon.
- **Quitterie Roquebert-Labbé** completed her PhD on September 5<sup>th</sup>, 2018, at Paris 1 University and has now a post-doctoral fellowship at the university of Paris V Descartes. Her thesis title is: 'Formal and informal care arrangements for the disabled elderly in France'; Supervisors: Lise Rochaix and Jérôme Wittwer (Bordeaux University); External referees: Audrey Laporte, Alain Paraponaris;

Chair: Thomas Barnay.

- **Marsaudon Antoine** will defend his thesis at Paris School of Economics in April 2019 on behavioral economics applied to health. Supervisors: Lise Rochaix (Paris 1, PSE – Hospinnomics) and Matteo M. Galizzi (LSE). Doctoral studies partly funded by Hospinnomics and partly by IRESP.
- **Setti Ali Raïs** will defend his thesis at Paris School of Economics in April 2019 on the ‘Impact of public policies on the diagnostic and therapeutic delays for rare disease patients’. Supervisors: Lise Rochaix and Sandy Tubeuf (Leeds – now Université Catholique de Louvain). Funding was obtained from the French rare diseases foundation IMAGINE.
- **Aleksandr Proshin**, in his third year, works on DRG refinements, in particular for Caesarian section, with a grant from Paris School of Economics doctoral school. Supervisors: Lise Rochaix and Audrey Laporte (Toronto University).
- **Ivan Tzintzun**, in his third year, works on behavioral economics, in particular on obesity. Supervisors: Lise Rochaix and Marc-Arthur Diaye (University of Paris 1). Doctoral grant from Mexican government.
- **Marc-Antoine Sanchez** has just started his PhD training under the joint supervision of Thomas Barnay (UPEC) and Lise Rochaix.

### ***7.2.3 - Completed Masters***

This year, a number of students graduated with an internship at Hospinnomics, whether from HEC, ENSAE (**Candice Fournier, Olivier Supplission**), Paris 1/PSE (**Rolando Leiva, Réka Halmai**).

### ***7.2.4 - Former research fellows’ new positions***

**Noémie Kiefer** moved to Belgium for another MSc after three years as research assistant at Hospinnomics. After two years as research assistant, **Laurie Rachet-Jacquet** obtained a PhD grant from the Marie Curie European network, under Luigi Siciliani’s supervision at York University, UK. **Rita Abdelsater** also obtained a PhD grant from Paris townhall to work at Sc. Po on environment/health issues using behavioural economics (nudges). All the interns completed their internship successfully and could continue their studies in the M2 curricula they expected.