

HOSPINNOMICS CHAIR

ACTIVITY REPORT September 2017 - September 2020

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I. Welcome

This activity report covers the period September 2017 – September 2020. The past three years have been exciting and highly productive. We are still on track with our 2014 scientific project, but new collaborations and successful grants have deeply enriched our research agenda. We have kept to the original plan of only relying on public funding, to avoid conflicts of interest. By doing so, we were able to interact with policymakers at national and international levels regarding health care reforms.

Our activity report for the first mandate (September 2014-2017) concluded that Hospinnomics had:

- conducted a scientific project that is in line with its mandate and develop dissemination and scientific outreach activities at national and international level.
- established a seed fund to support AP-HP's teams in applying for public funding for economic evaluation projects and to produce decision-support prioritized on an annual portfolio of deliverables.
- contributed to the development of an economic and social sciences task force located at AP-HP by setting up a network of researchers at PSE, AP-HP and more broadly.

During this second mandate, 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) pay-

ments (**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 policymakers, 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 Diagnosis Related Groups (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 only rely on public funding beyond the chair endowment by AP-HP and we managed to secure **external public funding** for 11 new projects over this three-year period, whether at national level or at European level, such as 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 large projects, such as PRDVEL, the evaluation of the impact of online appointment scheduling on the improvement of care delivery and accessibility at AP-HP have now come to a close.

Our applied work is based on **rigorous methodologies**: for instance, for the evaluation of the 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 17 articles in peer-reviewed journals, 12 in professional journals and 6 book chapters, on a wide range of issues. Details on all our research activities are provided in appendices.

Capacity and team building are 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 1 U., GATE, Lyon U., Aix-Marseille U. . . .) and abroad (UCL, U. of Toronto, OECD, Imperial College Business School, IUSM de Montréal, York U., LSE, Harvard T.H. Chan). At PhD level, we are very proud that four theses were successfully defended, and two PhD defenses are planned for September 2020. Two new PhD students are now on board. We have had the collaboration of interns (on average 4 to 5 per year), as well as foreign visitors (**Audrey Laporte, James Robinson**).

We hope you enjoy reading this report. For more information on our activities visit our website www.hospinnomics.eu.

II. Who are we?

Hospinnomics (Hospital/Innovation/Economics) is a research chair in health economics which aims to **bridge the gap** between academic research and stakeholders' needs for evidence-based decision-making. It was set up in 2014, following the joint decision of the director General of the Greater University Hospitals of Paris (GUHP - *Assistance Publique – Hôpitaux de Paris*), Martin Hirsch and the then 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. This scientific partnership received strong support from both AP-HP and PSE and it was renewed in May 2017 for five years. The chair governance is composed of a steering committee, with members of AP-HP and PSE, and an international Scientific Advisory Board (SAB)¹. The SAB monitors 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

1. 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).

research.

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 pricing 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 are carried out between the new technology (drugs, medical devices, procedures) and the care strategy it is meant to replace.

These objectives can be only achieved with the participation of a dedicated team. The permanent Hospinnomics team does not include permanent senior researchers, like INSERM or CNRS, but the chair can count on the active involvement of its affiliated researchers and PhD students that are sometimes funded by Hospinnomics. Details of all Hospinnomics staff, doctoral students and affiliated researchers over the reporting period are presented in section **VII**.

III. Hospinnomics in a nutshell

Scientific production

Engagement with the academic community over this three-year period took various forms, the first being the publication of several articles: 17 academic articles were published in peer-reviewed economic journals; 5 are at the stage of revise and resubmit, 10 are working papers ready for submission or currently in writing, 5 policy briefs have been published and 2 are in writing. At least 80 presentations were made at academic or professional conferences.

Several conferences were also organized after the September 2017 Hospinnomics workshop, of which:

- The 18th European Health Economics Workshop (EHEW) at PSE in 2018, on May 18th and 19th
- The annual conference of the French journal of Economics and management in health (JGES) on September 27th, 2019 on 'Paying for quality', followed by a special issue currently under press.
- The July 9th, 2020, EuHEA visio-conference, which closed the mandate of [Lise Rochaix](#) as president of EuHEA.

Expertise

Hospinnomics has a portfolio of 21 projects which are all publicly funded. In the past year, 11 project submissions were successful, with some of the projects covering up to 5 years. One of these new projects is an international collaboration CNRS-University of Toronto on the evaluation of quality payments for hip and knee replacement) with [Audrey](#)

Laporte, as part of a PhD joint supervision. This first project has led to the submission of a large research project (EFFIHOSP) to the French national research agency led by Hospinnomics and which extends the collaboration to another Canadian province (Québec) and brings together a large Consortium (EHESP, U. of Montpellier). Another project, RESISTE, focuses on the value of financial incentives to increase uptake of Cervical cancer screening for hard to reach women. It has also led to the submission of a larger European H2020 project led by Marc Bardou (U. of Dijon) currently under review (CCBIG-SCREEN).

Training, capacity-building

In June 2018, 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 (ref to appendix). It was released on the FUN (France Université Numérique) platform and will next be made available on Hospinnomics' website. 4 PhDs in economics were defended at PSE and Paris 1 over the past three years, under the supervision of Lise Rochaix. 8 Master dissertations were defended, with an increasing diversification, both in terms of disciplines (Management science, philosophy/ethics) and affiliations (PSE, Paris 1, Paris 5, Créteil, EN3S, Sc. Po, EHESP, HEC, ENSAE, European master's in health economics and Management). There is an increasing number of applications at the different levels (BAs, master dissertations, research assistants, PhDs), all of which are of high quality, based on reputation from the network of previous Hospinnomics' collaborators and strong teaching involvement.

Interactions between funding partners and networking

Hospinnomics, for its second mandate, has developed systematic collaborations with HTA units at AP-HP (URC-Eco) or nationally (U. Of Montpellier, U of Lyon 1), bringing a wider perspective on benefits measurement (behavioural/industrial/econometric/ethical dimensions). Regular meetings were organised with research department at AP-HP on expertise development and research projects. A successful series of two technical workshops (respectively on drug pricing and on hospital payment reforms has fostered interactions between academics and decision-makers at national level. Collaborations

with new partners, such as the 'Institut IMAGINE' have led to the funding of a part-time research assistant. Strong collaborations with other researchers (EHESP, Paris V, IRDES, ESSEC, Universities of Montpellier 1 and Rennes 1, U. de Lille 1) on existing or new projects have led to an increase in the number of affiliations.

IV. Our productions and activities

Hospinnomics' main objective is to foster a convergence between scientific production and expertise, and therefore to seek maximal linkage between research and decision-support. The dynamics between the two types of production can be illustrated as follows:

- Some of the expertise originally requested by AP-HP may lead to applications for public funding which, when successful, will usefully complement AP-HP's endowment, leading to a joint production of expertise and scientific research. These publicly funded projects, by bringing external human and social sciences abilities, enrich AP-HP's pool of competence.
- Conversely, some of the research questions initially developed by Hospinnomics' researchers may lead to the production of expertise, such as literature reviews or the production of data analyses, ahead of request that could be made by AP-HP teams or more broadly, by health policymakers.

In this section, we aim to jointly present research and expertise outputs for our three main research themes. In some cases, academic productions have not yet generated expertise (or will not do so), but the reverse does not hold. Results from expertise are indeed systematically published either in professional or in academic journals. We also jointly present productions and activities (such as conferences or seminars).

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. These two key dimensions for population health status improvement are addressed at Hospinnomics and presented respectively in sections IV.1 (health care

markets and regulation) and IV.2 (the individual perspective on health and health care). This research feeds back into the third theme of research, which is related to health systems' priority setting and how this process connects to the true value and returns on health of various innovations. The measurement of benefits is central here and research developed in this area is presented in section IV.3 (innovation evaluation). These three research priorities are multifaceted, and we are interested in their various dimensions and interactions. When possible, we combine an academic and an applied approach and broaden the perspective to include other social sciences contributions beyond economics.

1. Health care markets and regulation

Under this first research theme we analyze the system's organizational characteristics and examine the impact of regulatory changes on competition, access and service quality.

1.1. Care organization

Several applications have been chosen as natural topics, such as the public-private mix for hospital care, access to AE departments or to innovation: they have important systemwide implications and strong repercussions on primary care and more generally (for instance, prevention), in France and elsewhere.

1.1.1. The public private mix for hospital care

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/GHT), as well as in the private sector; b) a change in DRGs definition leading to refinements to encompass severity heterogeneity issues; c)

Reforms of AE departments' funding.

The French market for hospital care is shared by public and private producers. The public sector undertakes several 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.

- A first contribution, by [Daniel Herrera](#) and [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 ([Herrera-Araujo and Rochaix 2020a](#)).
- A second contribution by Joanna Piechucka (DIW Berlin) and [Daniel Herrera](#) 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 (Herrera and Piechucka 2017).

1.1.2. Regulating access to emergency care

Accident and Emergency (AE) services' congestion is a major concern in France and the COVID pandemic has recently led the government to take several measures to regulate access, including patient filtering or financial disincentives to overuse. Previous search from Paris-Dauphine university (B. Dormont et al., 2018) had shown the important levels of AE 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 AE 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.

Preliminary analysis of the primary care/hospital relationship, based on a first ENSAE MSc dissertation by Olivier Supplisson has relied on cross sectional and panel data models and has showed no statistically significant effect between the health supply and the volume of less-urgent patients attending the AE departments (Supplisson 2018). Merging data at the commune level on INSEE's databases has enabled Sarah Nedjar to further analyze the relationship between primary care and AE department admissions as a PSE (APE) MSc dissertation. Panel data analysis was conducted and highlighted a link between GP's density at the commune level and AE. Using the "Pacte Territoire Santé" as a treatment for eligible communes, Sarah Nedjar also conducted a difference-in-difference analysis showing that incentives for GP's to set up practice in less endowed communes is associated with a -5% effect on AE admissions. From a methodological standpoint, this research

demonstrates the interest and value of using the spillover-robust difference-in-differences methodology (Nedjar 2020).

Appropriate access to AE departments is also addressed in the BOOSTER project (Brain clOt persOnalized therapeutic Strategies for sTroke Emergent Reperfusion) launched in February 2020. The project brings together a large public/private Consortium (AP-HP, Fondation A. de Rothschild, Hôpital Foch, CHU de Normandie, Inserm, Hospices Civils de Lyon, Acticor Stago, Balt, Sensome). The project aims to develop strategies to diagnose brain clots and to develop patient stratification algorithms to predict response to personalized therapies to improve stroke patient pathways. Hospinnomics oversees the evaluation and analysis of the economic and ethical aspects. Ethics and economics approaches will complement each other to identify main issues from a societal perspective. A set of testable hypotheses has been developed on the added value of using an Artificial Intelligence (AI) algorithm to refer patients, adopting a societal point of view and addressing scaling up issues. For instance, Hospinnomics will consider: 1) The extent to which an AI algorithm improves overall Cost effectiveness by providing efficient patient-profiling, thereby avoiding costs of inappropriate AE referrals and associated capacity issues (e.g. delays in access for patients in higher need of treatment; 2) The conditions under which health care professionals will likely adopt the AI algorithm. Two specialist workshops will be organised on 'Economics and AI in Health Care' and 'AI use in acute situations', with a comprehensive report based on both workshops' inputs.

1.1.3. Regulating access to innovation

Our research focuses here on the two main stages in relation to drugs' and medical devices' market regulation: 1) Orphan drugs (or very expensive drugs) development and access; 2) Pricing and reimbursement.

Orphan drugs development

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 Halmai](#) 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 account for potential substitution across therapeutically equivalent pharmaceuticals.
- 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, 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 (Barrenho, Halmai, et al. 2019).

Research on rare diseases also started at Hospinnomics as part of [Setti Raïs](#)' PhD dissertation, funded by the French rare diseases foundation (Institut 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 (see [Setti Raïs](#)' PhD thesis).
- 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 (Raïs Ali and Tubeuf 2019).

- 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 account for 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 (see [Setti Raïs](#)' PhD thesis).

The partnership with the Imagine Institute will continue from September 2020 with the funding of a part-time research assistant position. The aim of this collaboration is to build on the work carried out by [Setti Raïs](#) during her PhD, by focusing on diagnostic delays.

Pricing and reimbursement

Principles of drug pricing and reimbursement (PR) have been presented by [Jean-Michel Josselin](#), [Laurie Rachet-Jacquet](#), [Véronique Raimond](#), [Lise Rochaix](#) as a chapter of the Encyclopedia of Law and Economics in 2017, with a forthcoming update in 2020 (Josselin et al. 2017). Collaborations have developed on this theme between researchers and decision-makers (representatives from AP-HP2 and healthcare regulatory bodies at national level³) by setting up a technical workshop on drug PR issues, organized by [Léa Toulemon](#) and [Izabela Jelovac](#). It has led to the publication of three papers in a special issue on drug pricing in the *Revue Française des Affaires Sociales*.

- The first paper (Rachet Jacquet et al. 2018) 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 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 (Cavalan et al. 2018), 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 (Rais Ali, Raimond, et al. 2018) 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.

Drug pricing issues has been analyzed at hospital level by [Léa Toulemon](#). 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 (Lea Toulemon 2018).

Laurie Rachet-Jacquet, Léa Toulemon and Lise Rochaix have further investigated the impact of a regulatory change in funding on the diffusion of high-cost in-hospital drugs. Under prospective payment schemes, prescribing these drugs places a high financial burden on hospitals and add-on lists have been implemented to avoid patient selection. Yet little is known of the impact of a drug delisting on subsequent volumes and prices. We follow four waves of delisting between 2010 and 2013 for twelve cancer drugs in France to document changes in the prescription volumes and the purchase prices negotiated by hospitals. Volumes, generic shares and purchase prices are studied at the molecule level over the period 2008-2016. Hospital fixed effects allow for unobserved heterogeneity in either prescription preferences or hospitals' bargaining power. Our results across the four waves suggest that prescription volumes, treatment choices (brand name versus generic form) and price levels are not systematically affected by delisting, nor do we find evidence of response heterogeneity by hospital type (Léa Toulemon, Rachet-Jacquet, et al. n.d.).

Lise Rochaix has also recently co-authored a paper with researchers from the London School of Economics on drugs fast-track evaluation procedures, published in the Lancet series in June 2020. The use of expedited programs aims at facilitating faster access to new drugs and devices has raised concern about the depth of data collected and in this paper, 5 key principles are proposed to provide the necessary incentives for pharmaceutical and device companies to generate comparative data on drugs and devices and assure timely availability of evidence that is fit for decision making (Naci et al. 2020).

1.2. Payment reforms

1.2.1. Hospital Out-of-Pocket payments' reforms

Out-of Pocket (OoP) payments in hospitals have been identified early on by Martin Hirsch, AP-HP General Director, as a priority research area for Hospinnomics. Indeed, little is known on how hospitals are paid for OoP payments, for patients with no private

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 carried out an extensive study of these hospital OoP payments, measuring for the first-time variations in OoP per condition type and has 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. A full report was sent to AP-HP, along with a "policy brief" explaining the methods and results. This study has received substantial coverage from various medias and is available on Hospinnomics' website.

Following this first contribution, Hospinnomics jointly set up a research consortium with two other research teams (ECEVE, INSERM UMR1123) and IRDES. The aim of this newly funded project is to carry out a multidisciplinary research program on the redistributive impacts of hospital OoPs in France. The EQUIRAC project is composed of three work packages (WP) studying respectively: 1) the impact of OoPs on patients; 2) the link between poverty and hospital OoPs; 3) OoPs reform impacts on hospitals. Hospinnomics oversees WP3 which extends the existing analysis to include three additional years (bringing the total dataset to more than 5.5 million rows) and testing new reform proposals, such as ruling out OoPs for hospital care. The recent COVID-19 crisis, entailing unusually healthcare bills for patients with no private insurance, has brought hospital OoPs to the forefront of public debate. The philosophical, legal, and political foundations of these reforms will also be analyzed under this WP and the conclusions of the EQUIRAC project will be relevant for decision-makers, beyond their scientific value.

1.2.2. Hospital and health care payments' reforms

Experimenting with innovative payment schemes

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 2018) 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 are selected by a national strategic committee (to which **Lise Rochaix** belongs) and 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 participation from Hospinnomics represented by **Christine Meyer**.

In order to provide further support, a specific technical workshop has been set up in January 2018 on 'innovative payment schemes'. This workshop brings 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), the social security (CNAMTS), the Paris regional health authority (ARS IdF) and the French national health board (HAS). In preparation of the technical workshop, a literature review has been produced in September 2017 on the relevance for the French reform of the international experience with bundled payment schemes. Finally, in relation to this topic, a special *matinée* has been organized by **Lise Rochaix** for the French Health Economists society (Collège des Economistes de la Santé) on April 4th, 2018.

Risk adjustment

Research on risk adjustment (RA) at Hospinnomics started with an analysis of a DRG tariff refinement that occurred in 2012 for French maternity wards. Using quasi-experimental data from French hospitals from 2010 to 2013, Alex Proshin, as part of his PhD thesis and together with **Lise Rochaix** and Alexandre Cazenave-Lacrouz, has tested the effects of this measure mainly aimed at reducing financial risks in French maternity wards. To estimate the resulting DRG incentives with regards to the choice between scheduled C-sections and normal deliveries, we predict, based on pre-admission patient characteristics, the probability of each possible child delivery outcome and calculate expected differences in associated tariffs. After controlling for multiple patients, hospital and regional characteristics and allowing for hospital and year effects, we found 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 performed. The results are robust to multiple formulations of DRG financial incentives. Our 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 (Proshin et al. [n.d.](#)).

Over time, countries have complexified their payment schemes to account for several dimensions on which patient selection might occur, such as severity. Article 51 has introduced in France the necessity to adjust care providers' payments to their patients' characteristics, i.e. to implement RA. The social security (CNAM) and the technical agency for hospital information (ATIH) were mandated to develop risk adjustment models. In order to facilitate the information sharing between researchers, public institutions, and decision-makers, Hospinnomics has focused its technical workshop on risk adjustment in 2020, with four sessions organized in 2020. This workshop brought together 20 to 40 participants at each session. The main issues associated with the building of a risk-adjusted payment schemes were the choice of the model, the choice of the variables to integrate into the model, the completeness of the data, and the performance of the model. Other topics were raised such as selection incentives for care providers related to the prediction of a patient pathway, and more technical issues were also tackled in relation to a specific model or specific experimentation. The extensive time dedicated to the discussion between every presentation resulted in rich material, now compiled into an overview of the current French research on risk adjustment and the upcoming implementation of risk adjusted payment schemes.

More recently, a large research project (EFFIHOSP) has been submitted to the French research agency (ANR). The project has been jointly submitted by Hospinnomics ([Lise Rochaix](#)) and the University of Laval, Quebec ([Maude Laberge](#)). It has given Hospinnomics the opportunity to bring together senior researchers as work package leaders: [Grégoire Mercier](#) (CHU Montpellier), [Nicolas Sirven](#) (Ecole des Hautes études en Santé Publique – EHESP), [Anne Lemay](#) (University of Montréal), and members of ATIH, [Marie-Caroline Clément](#) and [Mériem Saïd](#). The project also counts two internationally recognized health economists as collaborators: [Audrey Laporte](#) (University of Toronto) and [Randall](#)

Ellis (Boston University), both members of Hospinnomics' SAB. Scientific referees from ANR have given their support to the project (and the large international consortium has been considered a major asset by ANR referees) and the funding decision is now pending. The first main research hypothesis of EFFIHOSP is to identify the most promising risk adjustment models and test their implementation in both France and Québec, as well as Ontario. Starting with a thorough analysis of the well-established risk-adjustment methods developed in the US, the hierarchical clinical classification (HCC) tool developed by R. Ellis for Medicare (Cid et al. 2016), EFFIHOSP will offer an adaptation of this HCC tool to both the French and Canadian (Québec and Ontario) contexts. To address this first main hypothesis, a PhD student will be hosted by ATIH during part of the project period and the agency will also provide guidance on French national databases (PMSI, SNIIRAM) and predictive models.

Episode of care

The second EFFIHOSP's research question relates to Episode-Based Bundled Payments (EBBP), which are now considered in several countries in order to improve care coordination, between hospital and primary care. This axis will investigate whether RA tools such as HCC can be used for EBBPs, when encompassing the whole value chain, using microsimulations on French data and applications to the Quebec and Ontarian context. The third research question concentrates on the recent shift toward patient or community-based budget allocation models. Quebec has recently developed an elaborate costing information system which will facilitate the shift to a patient-based funding model. Ontario for its part has now experience with the Health Based Allocation Model (HBAM). The third research hypothesis is therefore to carry out microsimulations of these models on Quebec/Ontario data, with applications to the French context.

At national level, Hospinnomics is part of a consortium led by Nicolas Sirven, aiming to evaluate the French Article 51 experimentation on bundled payments: "Episode de Soins" (EDS). Other members of the consortium are Sciences Po, L'Ecole des Hautes Etudes en Santé Publique (EHESP), and Paris School of Economics (PSE). This consortium composed of economists, sociologists, and management scientists has already obtained five-year con-

tract with the CNAM and is currently developing a method and a protocol to address the various dimensions of the evaluation. The objective is to build a multidisciplinary evaluation of the experimental funding scheme implemented in 40 voluntary hospitals. Based on a multidisciplinary perspective, the evaluation includes ethnographic analysis, pathway analysis, and econometric evaluation. Hospinnomics has already provided a literature review based on a previous publication in 2017 by [Laurie Rachet-Jacquet](#), [Marc-Antoine Sanchez](#), and [Lise Rochaix](#). This literature review shows a decrease in expenses with bundled payments while retaining quality. Our contribution will mostly be on quantitative methods of evaluation, especially on the analysis of spending evolution and quality of care.

These new payment schemes also aim at fostering care quality by improving care coordination between care providers. The implementation of a DRG system in France has strengthened competition between providers, sometimes leading to coordination failures, as shown in sarcoma patients care pathways (4000 new patients in France each year). Hospinnomics is part of a Consortium led by Pr Jean-Yves Blay (Centre Léon Bérard), Pr Vincent Augusto (Ecole Nationale Supérieure des Mines), [Lionel Perrier](#) and Pr Emmanuel Oger (Centre de traitement et d'Analyse des données en Pharmaco épidémiologie) under the "OPTISARC" project which analyses incentives for non-specialized hospitals to refer their sarcoma patients to specialized care facilities. Since differences in survival rates have been observed depending on the patient pathway, this project aims to encourage surgery operations to be carried out in specialized centers, based on early diagnostics. Hospinnomics oversees the definition of a pricing model adapted to the path of these patients (adult or pediatric) and inspired by the experimental payment schemes developed under Article 51.

Paying for quality

Canada and France have introduced hospital payment funding reforms in recent years in part to contain costs and to improve quality of care. In 2005 France replaced its global budget system for hospitals with activity-based payments, with a new round of additional experimentations deployed in 2019 with the stated aim of fostering quality. Since 2012, the Canadian Province of Ontario has been undergoing a similar transition for a selected set

of clinical interventions, labelled Quality-based Procedures (QBPs), including hip/knee replacement surgeries. Joint replacement procedures were also included in the French reforms and so may serve as a natural basis of comparison across these jurisdictions in the analyses.

Based on the comparison of these two recent experiences in Canada and France, this project's objective is to provide evidence-based policy recommendations for the deployment and implementation of quality incentives schemes. To this end, this project will comprise a series of comparative quantitative studies aimed at developing policy simulation models evaluating the effects of hypothetical hospital payment funding models on hospital outcomes in the Ontario and French health care systems, relying on the most recent econometric and machine learning techniques applied to comprehensive patient level anonymized longitudinal administrative datasets. The project will be jointly led by Hospinnomics and the Canadian Centre for Health Economics (University of Toronto) with direct involvement of doctoral students from both laboratories, benefiting from the expertise of principal investigators and other faculty members of the core institutions with expertise with analyses of large linked datasets. This study represents one of the most comprehensive evaluations of the new activity-based payment models such as QBPs that have been introduced in health care systems around the world and will provide important insight into the extent to which such models have lived up to their promise of reducing expenditures and promoting care quality. A paper written by [Aleksandr Proshin](#) as part of his PhD thesis investigates the impact of quality-based procedures on orthopaedic care volumes and quality in Ontario Hospitals (YY OK). Another line of research is currently undertaken by Adrian Rohit as part of his PhD at the University of Toronto under the supervision of [Audrey Laporte](#). Using French data at ATIH while an invited guest at Hospinnomics, Adrian Rohit will be running simulations to measure the impact of implementing the Ontarian system of HBAM in France. These collaborations with the University of Toronto have been facilitated by a CNRS grant which funded both Alex Proshin and Adrian Rohit three-month exchanges.

Another review paper on quality measurement issues and the relevance of quality

related payments in France is under press by **Lise Rochaix**, with co-authors at HAS (YY OK), as part of a special issue of the *Journal de Gestion et d'Economie de la santé* on these topics, with Etienne Minvielle (Ecole Polytechnique) and **Lise Rochaix** as co-editors, following a one-day conference organized on September 27th, 2019. A comparison is made with 7 countries using quality indicators on a routine basis, whether based on process indicators or patient satisfaction indicators, such as PROMs and PREMs. The review 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.

2. The individual perspective in health and health care use

For most people, the initial link to the system at large is primary care and prevention. The question asked here is how patients 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 possible delays or under-use (or non-use) of free screening schemes.

2.1. Learning from 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.

2.1.1. Impact of health shocks on non-cognitive skills

Health shock and risk tolerance

This paper by [Antoine Marsaudon](#), [Mattéo Galizzi](#) (LSE) 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 everyone'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 (Marsaudon, Machado, et al. [n.d.](#)).

Health shocks and perception of control

This paper by [Antoine Marsaudon](#) 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 (Marsaudon 2019).

BeHealth

Research into the socio-economic and behavioral determinants of health states in the French population is now developing fast through a large ANR funded research project, under the joint leadership of **Antoine Nebout** (INRA) and **Mattéo Galizzi** (LSE), both affiliates at Hospinnomics. The project aims at improving the understanding of the individual factors driving to health behaviors and healthcare decisions (primary and secondary preventive care) by developing a behavioral economics module within the Constances epidemiological cohort in order to measure patient's individual economic preferences toward risk, ambiguity and time. These psychological variables and the associated biases are the indeed cornerstones of the normative and descriptive models of individual health decisions in health and behavioral economics. Hospinnomics is involved in WP3 which examines how individual preferences and socioeconomic indicators (SEP and economic insecurity) jointly determine individual choices of health-related behaviors in terms of primary prevention (e.g. over-eating, poor diets, lack of physical activity, smoking, alcohol abuse, drug use, sleep deprivation) and of secondary prevention (in particular for breast and cervical cancer screening).

2.1.2. Impact of health shocks on risky behaviours, employment and mental health

Health shocks and risky behaviours

Another dimension analyzed here is the potential impact of health shocks on risky behaviours and employment. A first paper by **Antoine Marsaudon** and **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 (Marsaudon and Rochaix 2019a).

Health shocks and mental health

Antoine Marsaudon and Lise Rochaix are currently analyzing the link between physical and mental health among the elderly. The goal is to use an exogenous shock in physical health (a fracture, stroke or heart attack) to purge the endogeneity of the relationship. We are specifically interested here in the elderly because they are more prone to these events as well as to deterioration of mental health. The results show that all the physical health events considered lead to a significant reduction in the mental health of those individuals experiencing such a health shock. This is valid for objective and subjective measures of mental health. Furthermore, we show that personality traits do not seem to influence the mental health state of individuals experiencing a health shock (Marsaudon and Rochaix 2019b).

Health shocks and employment

The relationship between health shocks and employment has been analyzed by Marc-Antoine Sanchez, Antoine Marsaudon, Thomas Barnay (Université Paris-Est Créteil) and Lise Rochaix. The paper is developed 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 (Sanchez et al. 2019).

2.1.3. Impact of employment shocks on health status

Reverse causality, running from an employment to health status and health behaviors, has also been analyzed through two successive MsC dissertations, the first on Russian data and the second on French data.

[Suzanne Angliviel](#) has produced her PSE APE M2 dissertation under the joint supervision of [Audrey Laporte](#) and [Lise Rochaix](#), studying the impact of unemployment at the individual and at the regional level on health and health behaviors in Russia. The data comes from the Russian Longitudinal Monitoring Survey, and spans the period 1994-2015. Using two different instrumental variable strategies, the findings show that being unemployed significantly worsens health and increases smoking and heavy drinking while reducing the use of preventive medical care, although it also decreases the risk of being overweight or obese. Bad regional economic conditions dampen this impact, with a closing up of the gap in the behaviors of the unemployed and the employed (Angliviel 2019).

[Thelma Arcelin](#) has produced her MSc dissertation for the European master's in health economics and Management under the joint supervision of David Dragone (University of Bologna) and [Lise Rochaix](#) on a similar topic, based on French data from the Constances cohort. The results show that unemployment is associated with poorer health, that the unemployed are more likely to adopt risky health behaviors and to forego medical care for financial reasons. Magnitudes are also found to be higher for men than for women, indicating that unemployment may be experienced more negatively by the male population. These results corroborate previous findings in the literature and extend evidence to the French population (Arcelin 2020).

2.1.4. Peers' effects on risky behaviours

The paper by [Ivan Tzintzun](#) explores peer effect heterogeneity in adolescent adjusted Body Mass Index (BMI), physical activity and dietary choices (Tzintzun [n.d.](#)). 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.

2.2. Inequalities in access to diagnosis

2.2.1. Social capital and education as determinants of time to diagnosis

In this study, [Setti Raïs](#), [Paul Dourgnon](#) and [Lise Rochaix](#) investigate 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 (Rais et al. 2018).

2.2.2. Behavioural 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. The DOD-Ks project carried out by [Christine Le Clainche](#), [Lise Rochaix](#), [Antoine Marsaudon](#) and a Consortium of researchers from the university of Paris 1, 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 Seintinelles). 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 the adoption of prevention behaviors. Second, individuals that are more risk averse and future-oriented are more likely to have shorter delays in obtaining diagnostics.

Comprehensive econometric analyses were performed on pooled datasets, testing various models (OLS/Parametric duration model/Cox model) and specifications. Consistent results were obtained, showing a statistically significant negative relationship between diagnosis delay and being a reserved type of person. The relationship between diagnosis delays and preferences is less clear-cut. The results obtained depend on the specification and the indicator used. Some specifications using the preference-based indicator support the hypothesis that there is a shorter diagnosis time for individuals with lower risk aversion. Hospinnomics is currently linking the two datasets in order to provide analyses based on the pooled sample with the aim to publish the results in a behavioral economics journal.

2.2.3. Socio-economic factors and delays in screening

Hospinnomics is a member of the RESISTE Consortium led by Pr. **Marc Bardou**. This project aims to assess the effectiveness, ethical and economic issues, as well as the distribution of benefits of an incentive intervention aimed at encouraging cervical cancer screening in socially disadvantaged women that associate more risk factors and poorer adherence to prevention measures. A mixed qualitative and quantitative method will make it possible to study: 1) the feasibility, acceptability, and implementation process of the apHPV approach; 2) the effects of apHPV on women's autonomy; 3) the effects of different modalities of return of apHPV on participation in screening (secondary judgment criterion); and 4) the transferability of the intervention between contexts in metropolitan France and overseas departments. The ASTAIRE tool will be used from the beginning and throughout the project in order to make it potentially transferable to other contexts. Hospinnomics oversees evaluating the efficiency of different techniques to encourage these women to participate in screening programs. We are also in charge of designing a revealed preferences approach concerning the self-test. A large European Consortium has been set up in order to submit a large comparative project on this topic (CBIG-SCREEN) and the answer is expected in the Autumn.

3. Innovation evaluation

One of the most common 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 section IV.3 therefore feeds back into the system design and regulation (IV.1), based on the individual analysis (IV.2).

3.1. Measuring health benefits

Research on this topic has been initiated by [Daniel Herrera](#), following a first paper published with James Hammitt and Christoph Rheinberger (Harvard T.H. Chan School of Public Health), which provides 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.

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 ([Herrera-Araujo and Rochaix 2020b](#)).

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.

3.2.1. Social capital and health interventions

This book chapter, written jointly by [Jean Guo](#), [Setti Raïs](#) and [Lise Rochaix](#), reviews the existing literature on social capital interventions conducted to-date which purport to promote health and 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 (Guo, Raïs, et al. 2018).

3.2.2. Physical activity and prevention

This research theme at Hospinnomics started with a request originally made by AP-HP regarding the value of physical activity programs for hospitalized patients with chronic diseases. The collaboration with [Grégory Ninot](#) (University of Montpellier 1), affiliated at 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 evaluating the impact of physical activity on health. A first literature review on economic evaluation was

produced and later extended to a full contribution for the INSERM report⁴ published in 2017. Following the report, a systematic review has been undertaken by Marlène Guillon (University of Montpellier) and **Lise Rochaix**, 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 illnesses, cancers, respiratory diseases, and diabetes/obesity (Marlène Guillon et al. 2018).

A policy brief has also been produced by the same authors on the issue of public reimbursement of physical activity for secondary prevention. Following a request from the Ministry of sports, this policy brief reviews the international evidence on the impact of PA reimbursement to provide several recommendations.

Ivan Tzintzun and **Lise Rochaix** are working on a joint paper which will be included in **Ivan Tzintzun**'s PhD thesis, entitled '*The Causal Effect of Physical Activity on Health in Early Adulthood.*' This article explores the effect of physical activity (PA) on self-perceived health status and the number of non-communicable diseases during early adulthood. It analyzes the impact of leisure- and work-related physical activity. To deal with endogeneity issues, we combine an instrumental variable approach with a fixed effect strategy. We instrument the measures on physical activity by exploiting the interaction of environmental dynamic characteristics with a unique and rich database on genetic markers in the AddHealth data project. The number of instruments for such empirical exercise is considerably high. In order to reduce its dimensionality, we apply ML techniques to find an optimal combination of instruments. Results suggest that leisure-related physical activity has a significant positive effect on health and reduces the number of chronic diseases. Moreover, heavy

work-related physical activity has the opposite effect: it decreases self-perceived health status and increases the number of chronic diseases. Heterogeneity tests are also explored and indicate that individuals with high sedentary levels are more likely to experience the highest health gains after increasing PA levels.

3.3. Decremental cost-effective interventions

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 (LSE) 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 health technology assessment (HTA) and health system performance measurement. **Lise Rochaix** is leader for WP11 which involves Hospinnomics and URC-éco at AP-HP and **Emelie Lindström** is project manager. The research areas addressed in WP11 deal with two different types of interventions, namely decremental cost-effectiveness interventions and non-pharmaceutical interventions (NPIs). Although these interventions 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, namely increasing the overall health of the population. It is therefore important to inquire into stakeholders' preferences and willingness to accept such decrementally cost-effective or non-drug interventions.

The project consists of three tasks. In the first task, URC-éco conducted a systematic literature review, currently under revision, identifying 86 interventions offering prospects for efficiency gains outside incremental innovations (i.e. those located in the South-West Quadrant in the marginal clinical benefits/ costs diagram). Based on a selection of these interventions, a first set of attributes and levels has been identified for the second task, which aims at inquiring into stakeholders' preferences and willingness to adopt NPIs in complement, or in substitution, to usual care. Hospinnomics designed and piloted the preference elicitation study and the online Discrete Choice Experiment (DCE) which will

be carried out in September 2020, involving decision-makers in a number of European countries. In the third task, we will bring together ethical, sociological, political science and regulatory perspectives to better understand the obstacles and issues related to the implementation of these interventions. The findings from the quantitative results of the Discrete choice experiment and from the qualitative analyses will be communicated through a political economy report in March 2021. A toolbox will be provided to guide policymakers in their decision to replace usual care by decrementally cost-effective interventions, making explicit the associated risks and trade-offs.

The challenges related to the evaluation of the efficacy and the costs of NPIs will be analyzed in a separate policy brief which will discuss the intrinsic nature of NPIs in relation to the evaluation requirements. Indeed, producing robust evidence on the clinical efficacy of NPIs is challenging, as the paradigm of drugs evaluation processes requires study designs that are incompatible with the intrinsic nature of most NPIs. In parallel, a literature review on biosimilars (which can be considered as decrementally cost-effective strategies) is undertaken in order to document the obstacles to implementation.

3.4. Organizational innovation

This section covers several publicly funded projects which address different dimensions of organizational innovations, Hospinomics overseeing their evaluation.

3.4.1. 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 report was produced by **Noémie Kiefer** and a joint paper with **Lise Rochaix**, **Jean-Claude K. Dupont** and **Rolando Leiva** is currently under revision for the Journal of Occupational Rehabilitation (Kiefer et al. n.d.).

3.4.2. Access to hospital outpatient care (online appointment - PRDVEL)

An online appointment system for outpatient consultations by Doctolib 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. Several Hospinnomics' members have been involved in this evaluation including **Daniel Herrera**, **Noémie Kiefer**, **Camille Luya-Guedj**, **Maria Porras**, **Rolando Leiva**, **Clara Medioni** and **Thomas Pelloquin**. An evaluation protocol has been defined in August 2017, with a baseline study produced in March 2018. The final evaluation is under finalization and will be available in Fall 2020. Preliminary results based on extractions from both Doctolib and OPALE (AP-HP information system) have been presented in July 2018. Last results, covering the whole implementation period of the intervention (until October 2019) confirm the intermediate impact assessment results. The Web-based appointment service does lead to

an increase in activity, a decrease in the no-show rate and an increase in delay before first appointment. This applied research has given Hospinnomics the opportunity to adopt a pragmatic evaluation approach, providing AP-HP with intermediate impact evaluation results on which to base their decision to expand the program, followed by a final impact evaluation which will be published in an academic journal. Intermediate results have received an important coverage by national medias in 2019 (Figaro, AFP, Hospimédia, Les Echos, France Inter).

3.4.3. Online therapeutic education (PIC-R)

This project (PIC-R) is an economic evaluation project (PRME) led by **Lise Roचाix** and by Evangéline Pillebout, nephrologist at AP-HP. It aims at evaluating the cost-effectiveness of therapeutic education in hospitals using an interactive and community-based internet platform in renal diseases developed by DOCMADI. Based on a three-armed randomization scheme, it will bring evidence about the efficiency of therapeutic patient education (TPE) in nephrology when complemented by access to an internet-based interactive community platform compared to the existing one, as well as to study in more detail the effect of introducing social and community functionalities in addition to TPE. Data collection is ongoing for an observation period of 18M, the first patients having completed their participation in the first semester 2020. All 11 investigating centers are recruiting patients actively, with 700+ randomized patients. Baseline data are available for 400+ patients and interim follow-up data (M9) are available for 300 patients. This project brings together expertise from clinicians and economists, building on both sides' experience of conducting randomized controlled studies, especially through setting up a collaboration between AP-HP and J-PAL. As a result, in addition to its scientific objectives, the PIC-R project has already led to adapting electronic clinical report forms (CRF CleanWeb) to the needs of collecting large sets of patient-reported data, expanding internal capacity and experience in using these tools (which will be valuable in future studies), and collaborating with an external polling society in order to help patients fill-in questionnaires, thereby reducing non-response rates significantly.

3.4.4. Day surgery for endometrial cancer (AMBU-ENDO)

This research program (AMBU-ENDO) is another economic evaluation project (PRME) led by **Lise Rochaix** and by a clinician from AP-HP, Geoffroy Canlorbe. It is carried out at Hospinnomics with the collaboration of affiliates: **Jean-Michel Josselin** (University of Rennes 1) and **Valérie Clément** (University of Montpellier 1). In addition to evaluating the cost-effectiveness of day surgery versus full-hospitalization in endometrial cancer, two secondary objectives consist in comparing 1 two health-benefits valuation strategies (in terms of quality-adjusted life years and in terms of well-being), 2 the preferences of patients and those of professionals regarding the main characteristics of endometrial cancer management. In addition to generating evidence on the cost-effectiveness of day surgery, this project will thus produce valuable knowledge on two important health economics issues which are both relevant in Hospinnomics' research agenda (health benefits measurement and individual preferences). The preference elicitation study in this project consists in a discrete choice experiment; Hospinnomics delivers a training session in each investigating center (5 of 6 are active to date) so that local clinical research staff can understand the objectives and the methodological underpinnings, which is important for data quality. Such a project offers an opportunity to learn from experimental practices in both economic and clinical settings, and to find practical ways on how to conciliate their respective constraints.

3.4.5. Social robots in elderly care (ROSIE)

This project (ROSIE) has been initiated by GEROND'IF, a network of gerontology centers in the Paris region, coordinated by AP-HP. This project is coordinated by the Living-Lab of AP-HP Broca hospital. 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 elderly care in France. Hospinnomics' intervention in this project is methodological; in cooperation with Benoit Dervaux (CHU Lille), Hospinnomics offers guidance in the adaption of standards of economic evaluation methods to the special features of these medical devices, to the health needs of institutionalized elderlies, and to the specificities of elderly care environments. As the economic evidence on social robots is scarce, the work is based on

qualitative survey data from elderly care institutions using, or conducting experiments with it; these data are analyzed in the light of the methodological guidance from the French National Authority for Health (HAS) that has been updated in 2020. Where data are missing on key economic evaluation issues, the analysis is completed by qualitative information from interviews that have been carried out by the GEROND'IF and the Broca Living-Lab. The following step will consist in applying consensus-building methods with stakeholders to define suitable guidance for the economic evaluation of social robots in elderly care. Methods' adaptations will surely be needed, due to the COVID pandemic.

3.4.6. Telehealth for organ donors (CRISTAL IMAGE)

This project (CRISTAL IMAGE), 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). CRISTAL is a distant-information system allowing real-time visualization of donor organs' characteristics and imagery for transplant teams to decide whether to undertake a transplantation procedure. URC-éco is in charge of the economic evaluation of this project while Hospinnomics is responsible for nesting in this project a preference-elicitation study to investigate in the willingness of transplantation professionals to adopt this system, based on a Best-Worst Scaling discrete choice experiment. This nested study will generate evidence on the drivers but also the hurdles to be expected for an appropriate use of this information system by transplant teams in their decisions on organ procurement.

3.4.7. Genomics platforms (SEQOGEN)

Next generation sequencing (NGS) technologies are increasingly used to aid in clinical diagnosis, prognostication and choice of therapy. The French program for genomic medicine (FMG2025), taking account of similar international programs, is a "hybrid care/research system" based on operating two platforms, SeqOIA and AURAGEN, respectively in Paris (Ile de France) and in Lyon regions (Auvergne Rhône-Alpes). Health economics units from Lyon and Paris, including Hospinnomics, are in charge of conducting an evaluation of the introduction of NGS in a set of pre-indications defined by

the French National Authority for Health (HAS). This project (SEQOGEN) consists of an integrated economic evaluation of the two platforms based on three work-packages: organization and production costs, performance indicators and impact on the care pathway and evaluation of efficiency and medium-term projections. **Lise Rochaix** oversees the latter work-package jointly with **Lionel Perrier** (Centre Léon Bérard) although all the health economics teams will collaborate on the three work-packages.

3.5. Patient/Public involvement

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 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.

To systematically include PPI in research and evaluation agendas is challenging, 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), as well as from the Quebec and Australian health authorities. 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.

3.5.1. Genetics of pediatric malign hemopathies

This project 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, Pr. Arnaud Petit, on the genetics of pediatric malign hemopathies (AML). Hospinnomics' involvement is mostly ethics-oriented, under [Jean-Claude K. 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 might therefore offer opportunities for a future joint application (e.g. for a PRME) led by Hospinnomics. This project has already allowed to collect data from two web-based national surveys, fulfilled by French senior pediatric hematologists and oncologists and by young interns respectively. Data analysis is currently done in collaboration with the clinical research team of Saint-Louis Hospital and a subsequent qualitative survey will be carried out in collaboration with the clinical research team of Necker Hospital.

Value-based healthcare (VBHC) is a topic of interest for AP-HP and self-reported data collection from patients is the very first step towards valuing healthcare from patient's perspective. Collecting PROMs has the potential to challenge research and evaluation practices in various ways; conversely, adequate patient-related data, especially valid quality of life outcomes measures, is regularly missing in economic evaluation, as observed by the HAS. Pediatrics, in particular pediatric oncology, represents an exemplary domain for addressing these issues in their complex ramifications: data quality, variety of indicators, additional burden on patients, underlying organizational or allocative objectives, etc. In addition, long collaboration with Europe-wide professional organization (SIOP-E) and patient organization (CCI-E) offers prospects to develop this research in a collaborative way with all stakeholders. In 2020, an Hospinnomics' intern, [Jeesoo Lee](#), wrote her master thesis on the use and data quality of electronic patient-reported outcomes (ePRO) in pediatric oncology (PO), based on a systematic literature review (Lee 2020). Indeed, given the growing evidence of acceptability, feasibility, and real-life uses of patient-reported outcomes, coupled with increasing integration of novel technologies in clinical research

and practice, it is crucial to evaluate if and how ePRO may have an important role in improving quality of healthcare and health outcomes of pediatric oncology population.

V. Knowledge transfer

Knowledge Transfer and Exchange - KTE has been defined by Mitton *et al* (2007) as ‘an interactive process involving the interchange of knowledge between research users and researcher producers.’ It has become an essential part of research institutions’ activities, particularly so at Hospinnomics. Engagement is required at early stages of research with different stakeholders: the chair partners, the public policy community and the public at large.

1. Engagement with partners (AP-HP/PSE)

Identifying the positive externalities associated for both partners to Hospinnomics’ activity is essential. From PSE perspective, what matters most is the number of high-quality publications on topics which are new and policy relevant. As for AP-HP, positive externalities are derived from research projects obtained by Hospinnomics under external public funding, which brings additional resources accruing to partnering AP-HP teams. Reputational effects at national and international level, as well as access to a pool of young scholars in economics and social sciences constitute other important components of the return on investment for AP-HP. The response to public calls has indeed constituted a strong lever in bringing together the two partners. In some cases, AP-HP’s suggestions for expertise contained a genuine research dimension or required additional resources which were found through responses to public calls. Public funding, when granted, has enabled quantitative and/or qualitative applied research which in most cases has led to submissions to academic journals.

Accordingly, Hospinnomics’ added value to AP-HP is based on four main components,

namely:

- Reputation, through academic publications showing active development of health economics research.
- Expertise, through the development of an applied research agenda relying on a portfolio of deliverables on key strategic topics for the institution and on a portfolio of active projects from public calls.
- Engagement with public policy community (see V.2), made possible by a strict policy of absence of conflicts of interests.
- Capacity-building, both through the training of young economists on socially relevant health topics and through the awareness-raising of research-, clinical-, patients- and larger public- communities about the methods and the relevance of economics in health (see V.3).

To focus on expertise, the return for AP-HP on its partnership through Hospinnomics therefore takes two main forms, namely of positive externalities from research projects obtained on public calls and of a portfolio of deliverables, especially full reports on key strategic topics for the institution.

Positive (direct or indirect) externalities from research projects have been classified under 10 items, specifying whether Hospinnomics' involvement in a particular project allows 1° to generate new- or to generate new analyses from existing- data, 2° to assist decision-making at AP-HP level 3° to expand AP-HP's range of methodological tools, 4° to develop active research collaborations with AP-HP's professionals, 5° to bring a new project in AP-HP portfolio as a sponsor, 6° to organize a "technical workshop" with AP-HP professionals together with policy-makers, 7° to disseminate results in general medias or to offer training to AP-HP professionals, 8° to offer service and support on the evaluation of AP-HP's adoption of innovations, 9° to improve research tools or practices, and/or 10° to bring additional research funding to other AP-HP research teams.

Hospinnomics' portfolio of deliverables has benefited from a close coordination with AP-HP directorate for research (DRCI) over the period. This has allowed to pinpoint re-

search topics of strategic interest for the institution, and to their update and adaptation. The main topics investigated by Hospinnomics over the period cover: out-of-pocket payment, online appointment, payment schemes, risk stratification, Emergency care organization, value-based healthcare. This research work has led to delivering 5 reports (on OOP, and 4 reports on PRDVEL, namely protocol, baseline, intermediate and results). These research results have been obtained through close collaboration with central directorates of AP-HP (DPT, DEFIP, ...) and these have been quoted in national medias in 2019 (*Le Figaro, La Croix, l'Opinion*, etc.).

Hospinnomics was actively involved in AP-HP's efforts towards the development of social sciences and humanities research in health over the period, by his deputy taking the interim of the Philosophy Chair (2017-2018) and by responding to two research calls collaboratively with its scientific director in 2019 and 2020, on robot-assisted surgery and on priority-settings during COVID respectively. **Jean-Claude K. Dupont** has taken active part in three internal AP-HP expert bodies, the scientific and ethics committee of GPUH's datawarehouse (CSE, 2017-2020), DRCI's CRC innovation (2018, 2019) and GPUH's COVID research steering committee (2020).

2. Engagement with the public policy community

Hospinnomics' 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. **Lise Rochaix**, as chair of the board of the national agency for hospital information (Agence Technique pour l'Information Hospitalière -ATIH) has participated in several joint actions regarding hospital payment reforms. She has involved members of ATIH in a large consortium to respond to a bilateral research call from the French National research agency (ANR) and set up a large project involving two Canadian provinces (Ontario and Quebec) and France. This project (EFFIHOSP) will be carried out with Ontario, independently of the funding response which is still pending.

Lise Rochaix 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* (SGPI) the forecasting division of the Prime minister's office (*France Stratégie*) in order to encourage the use of economic calculus, with a special responsibility for health. In November 2019, she has been asked to lead a large working group for *France Stratégie*, the SGPI and the Ministry of environment, jointly with Benoît Dervaux, on developing the use of economic calculus to measure morbidity impacts of environmental projects. A Master dissertation from the Ecole des Ponts, under the EDCBA master is currently written by Vincent Horvilleur on the introduction of equity measures in the evaluation of these large projects. Other mandates from **Lise Rochaix** include the Committee for national accounts or the national conference for health.

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 oversees 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) as part of the French plan *Genomic Medicine 2025* (PFMG). He also participated in scientific committees and expert groups at French Public Health Research Institute (IRESP) on Health services research, non-drug interventions, and polyhandicap.

One of the most successful events organized by Hospinnomics is its annual technical workshops which provide opportunities to interact with the both AP-HP professionals and the public policy community. Technical workshops were organized on hospital payment experiments (2018), on evaluation methods (2019), and on risk adjustment (2020) gathering

between 15 to 40 academics and professionals and national policymakers on a regular basis. In 2020, the technical workshop on Hospital payment reforms has focused on the topic of risk adjustment, with four sessions which included presentations from members of ATIH, CNAMTS, URC-Eco, Hospinnomics, the Ministry of Health (Direction de la Sécurité Sociale). Another technical workshop was run in parallel on drugs and devices regulation. In the past year, three sessions were organized jointly with the University of Paris (LIRAES), with **Thomas Rapp**, on drug regulation (February 11th, 2019), with Pr. Jaime Caro, from the London School of Economics on DICE models and their applications and on July 3rd, 2019, by Pr. Frank R. Lichtenberg (U. of Columbia) on drug price regulation. Pr. **James Robinson** (Berkeley U.) also held a session on December 17th, 2019, on a comparison of biosimilars regulation between the US, Germany and France.

3. Engagement with the academic community and the public at large

Engagement with the academic community took various forms, the most significant being the organization of the 18th European Health Economics Workshop (EHEW) at PSE on May 18th and 19th. 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. Hospinnomics has organized invitations for PSE's weekly behavioral seminar, with **Audrey Laporte** (University of Toronto) during her two visiting stays (May and October/November 2018) and Randall Ellis (Boston University, May 17th, 2018).

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. Several sessions were also organized by **Lise Rochaix** at the 'Journées de l'Économie - JECO, one of which was a panel on 'Economic calculus

applied to social policies. She was also a panelist for the session on ‘the price of innovative drugs in 2018. An international workshop, organized jointly by Hospinnomics and IRDES, has also taken place at AP-HP (Hotel Scipion) on September 5th, 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 (2018-2020), after 2 years as president elect (2016-2018). She was invited at the plenary closing panel of the International Health economics association (iHEA) in Basel, July 13th, 2019. As president of EuHEA, he organized the virtual EuHEA conference on July 9th, 2020, together with the executive board and the University of Oslo, and it also marked the end of **Lise Rochaix**’s mandate. The priorities defined for this two-year mandate were 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. Other actions under EuHEA’s banner include an invited session on hospital efficiency at the European Association of Hospital Managers annual congress in Lisbon in September 2018. As past EuHEA president, she is now a full member of the board of directors of the international health economics association (iHEA).

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).

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. This has for instance led Jean-Claude to supervise two master theses on health economics’ related topics (price of anti-cancer agents in the medical prescription,

and generic-drugs shortages prevention). First master thesis has been expanded in a M.D. doctoral thesis (defense planned on Nov. 20, JCKD as co-director).

JCKD has been invited twice to join the scientific committee of a research call on Health Services Research held by IRESP. The committee oversees 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-organized 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 K. 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 31st, 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 were 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.

VI. Publications and presentations

1. Publications

1.1. Articles published in peer-reviewed journals

Bishai, David and Lise Rochaix (2020). “The Meliorist Project in health economics”. *Health Economics* 29.5, pp. 537–539.

Herrera-Araujo, Daniel and Lise Rochaix (2020b). “Does the Value per Statistical Life vary with age or baseline health? Evidence from a compensating wage study in France”. *Journal of Environmental Economics and Management*, p. 102338.

Naci, Huseyin, Maximilian Salcher-Konrad, Aaron S Kesselheim, Beate Wieseler, Lise Rochaix, Rita F Redberg, Georgia Salanti, Emily Jackson, Sarah Garner, T Scott Stroup, et al. (2020). “Generating comparative evidence on new drugs and devices before approval”. *The Lancet* 395.10228, pp. 986–997.

Barrenho, Eliana, Marisa Miraldo, and Peter C Smith (2019). “Does global drug innovation correspond to burden of disease? The neglected diseases in developed and developing countries”. *Health economics* 28.1, pp. 123–143.

Clément, Valérie and Véronique Raimond (2019). “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* 22.2, pp. 220–224.

Coquerelle, Severine, Mariem Ghardallou, Setti Rais, Pierre Taupin, Fabien Touzot, Laure Boquet, Stephane Blanche, Semir Benaouadi, Thomas Brice, Caroline Tuchmann-Durand, et al. (2019). “Innovative curative treatment of beta thalassemia: Cost-efficacy analysis of gene therapy versus allogenic hematopoietic stem-cell transplantation”. *Human gene therapy* 30.6, pp. 753–761.

- Sanchez, Marc-Antoine, Thomas Barnay, Antoine Marsaudon, and Lise Rochaix (2019). "L'influence des accidents de la route sur les trajectoires professionnelles des personnels en fin de carrière, à partir de la cohorte Gazel". *Revue d'économie politique* 129.4, pp. 553–589.
- Cavalan, Quentin, Maud Hazan, Irène Hu, and Roxane Zighed (2018). "Prices, patents and access to drugs: Views on equity and efficiency in the global pharmaceutical industry". *Revue française des affaires sociales* 3, pp. 249–268.
- Guillon, Marlène, Lise Rochaix, and Jean-Claude K Dupont (2018). "Cost-effectiveness of interventions based on physical activity in the treatment of chronic conditions: a systematic literature review". *International journal of technology assessment in health care* 34.5, pp. 481–497.
- Hammitt, James K and Daniel Herrera-Araujo (2018). "Peeling back the onion: Using latent class analysis to uncover heterogeneous responses to stated preference surveys". *Journal of Environmental Economics and Management* 87, pp. 165–189.
- Marks, Sara J, Emily Kumpel, Jean Guo, Jamie Bartram, and Jennifer Davis (2018). "Pathways to sustainability: A fuzzy-set qualitative comparative analysis of rural water supply programs". *Journal of Cleaner Production* 205, pp. 789–798.
- Rachet Jacquet, Laurie, Léa Toulemon, Véronique Raimond, Albane Degrossat-Théas, Lise Rochaix, and Pascal Paubel (2018). "Le prix des médicaments en France: présentation synthétique des évolutions récentes du système français de fixation des prix". *Revue française des affaires sociales* 3, pp. 47–67.
- Rais Ali, Setti, Véronique Raimond, Albane Degrossat-Théas, Laurie Rachet Jacquet, Lise Rochaix, Xiaoyan Lu, and Pascal Paubel (2018). "Early access schemes and pricing strategies: A case study on temporary authorization for use in France from 1994 to 2016". *Revue française des affaires sociales* 3, pp. 69–89.
- Roquebert, Quitterie, Roméo Fontaine, and Agnès Gramain (2018). "Aider un parent âgé dépendant. Configurations d'aide et interactions dans les fratries en France". *Population* 73.2, pp. 323–350.
- Toulemon, Lea (2018). "The effect of group purchasing on prices hospitals pay for medicines". *Health economics* 27.9, pp. 1380–1393.

Herrera-Araujo, Daniel, Sally Shaywitz, Bennett Shaywitz, Karen E Marchione, Reissa Michaels, John Holalan, and James K Hammitt (2017). "Early access schemes and pricing strategies: A case study on temporary authorization for use in France from 1994 to 2016". *Journal of Benefit Cost Analysis* 8.1, pp. 24–48.

Roquebert, Quitterie and Marianne Tenand (2017). "Pay less, consume more? The price elasticity of home care for the disabled elderly in France". *Health economics* 26.9, pp. 1162–1174.

1.2. Publications in professional journals

Béranger, Agathe, Naim Bouazza, Amélie de Haut de Sigy, Anne-Charlotte Foubert-Wenc, Dominique Davous, Isabelle Aerts, Birgit Georger, Anne Auvrignon, Benoit Brethon, Pierre Leblond, Jean-Claude K. Dupont, et al. (2019). "Parents' and children's comprehension and decision in a paediatric early phase oncology trial: a prospective study". *Archives of disease in childhood* 104.10, pp. 947–952.

Marsaudon, Antoine and Lise Rochaix (2019a). "Impact d'un choc de santé sur les modes de vie, exploitation de la cohorte Gazel". *Revue française d'économie* 34.1, pp. 183–225.

Rais Ali, Setti and Sandy Tubeuf (2019). "(In)-Equality in the Allocation of R&D Resources for Rare Diseases". *Social Justice Research* 32.3, pp. 277–317.

Zarca, Kevin, Jean-Claude K Dupont, Lorène Jacoud, Julie Bulsei, Olivier Huot, Hélène Logerot, and Isabelle Durand-Zaleski (2019). "Effectiveness and efficiency of teleimaging in the transplantation process: a mixed method protocol". *BMC health services research* 19.1, p. 672.

Dupont, Jean-Claude K., Clémence Thébaut, and Jérôme Wittwer (2018). "Éthique et économie de la santé : quels enjeux actuels ?" *La lettre du Collège des économistes de la santé*.

Marsaudon, Antoine (2018g). "Les chocs de santé affectent-ils la stabilité des traits de personnalité ?" *Association Française des Sciences Economiques (blog)*.

Raimond, Véronique, Cléa Sambuc, and Leslie Pibouleau (2018). "Ethics evaluation revealing decision-maker motives: a case of neonatal screening". *International Journal of Technology Assessment in Health Care* 34.2, p. 189.

- Surun, Aurore, Marie-Églantine Dujaric, Isabelle Aerts, Daniel Orbach, Irène Jiménez, Hélène Pacquement, Gudrun Schleiermacher, Franck Bourdeaut, Jean Michon, Jean-Claude K Dupont, et al. (2018). "Enrollment in early-phase clinical trials in pediatric oncology: The experience at Institut Curie". *Pediatric Blood & Cancer* 65.5, e26916.
- Toulemon, Léa and Lexane Weber-Baghdigui (2018). "Licenciement et qualité de l'emploi en Allemagne". *Note de la Fabrique de l'industrie (commentaire sur l'article "Parcours de travailleurs dans une économie mondialisée", d'Eugénie Tenezakis et Philippe Frocrain)*.
- Dupont, Jean-Claude K (2017). "Les enjeux d'évaluation du numérique dans le soin". in *Danièle Brun, ss. dir., Tous connectés, le numérique et le soin, Paris*.
- Marsaudon, Antoine and Lise Rochaix (2017). "Survenue d'un problème de santé : impact sur la consommation de tabac". *Journal d'information de la cohort GAZEL n56*.
- Rachet-Jacquet, Laurie, Lise Rochaix, and Marc-Antoine Sanchez (2017). "Revue de littérature en vue de l'expérimentation d'un nouveau mode de tarification à l'hôpital : le paiement à l'épisode de soins". *Site Internet d'Hospinnomics*.

1.3. Book chapters

- Barrenho, Eliana and Marisa Miraldo (2018). "R&D in Pharmaceutical Markets: Measuring Innovation and its Determinants". *Health Econometrics in Contributions to Economic Analysis*. Ed. by Francesco Moscone and Badi Baltagi. Bingley, UK: Emerald Publishing, pp. 201–233.
- Dupont, Jean-Claude K (2018). "Le principe de proportionnalité dans l'évaluation économique des technologies de santé". *Sauramps medical*. Montpellier.
- Guo, Jean, Setti Rais, and Lise Rochaix (2018). "Social capital and health interventions: enhancing social capital to improve health". *Elgar Companion to Social Capital and Health*. Edward Elgar Publishing.
- Dupont, Jean-Claude K and François Doz (2017). "La notion de personne dans la médecine personnalisée". *Essais précoces en cancérologie, éthique et justice*. Ed. by Amiel P. Gateau V. Doz F.
- Guillon, Marlène, Jean-Claude K Dupont, and Lise Rochaix (2017). "Cost-effectiveness of interventions based on physical exercise in the treatment of chronic diseases: A systematic literature review". *Rapport INSERM*.

Josselin, Jean-Michel, Laurie Rachet-Jacquet, Véronique Raimond, and Lise Rochaix (2017). "Drug Price Regulation". *Encyclopedia of Law and Economics*.

1.4. Articles accepted or in revision in peer-reviewed journals

Marsaudon, Antoine and Setti Rais (2019). "Impact of health shock on personality traits, evidence from locus of control". Under review for *Economic Policy*.

Tzintzun, Ivan and Santiago Guerrero (2019). "EU Regulations to Fight Nutrient Surpluses: the Case of Nitrate Vulnerable Zones". Working paper SSRN, Revise and Resubmit to the *Journal of Environmental Economics and Management*.

Rais Ali, Setti and Sandy Tubeuf (2018). "Seuil d'acceptabilité des technologies de santé: quel retour d'expérience 20 ans après?" PSE Working Paper n2018-20, Revise and Resubmit to *Les annales des Mines – Gérer et Comprendre*.

Thébaud, Clémence, Cléa Sambuc, and Jean-Claude K. Dupont (2017). "Methods for assessing ethical aspects at the French National Authority for Health". Revised and Resubmitted to the *International Journal of Technology Assessment in Health Care*.

Marsaudon, Antoine and Josselin Thuilliez (2016a). "Does democratization reduce the HIV prevalence rate? Evidence from Kenya". Under review for *Economics of Transition*.

1.5. Articles submitted

Barrenho, Eliana, Simone Ghislandi, and Marisa Miraldo (n.d.). "Forecasting the future R&D landscape and availability of new medicines". Submitted to *The Lancet*.

Barrenho, Eliana, Peter C. Smith, and Marisa Miraldo (n.d.). "Measuring inequalities in drug innovation in terms of unmet health need". Submitted to *Nature Reviews Drug Discovery*.

Florez-Acosta, Jorge and Daniel Herrera-Araujo (n.d.). "Multiproduct retailing and buyer power: the effects of product delisting on consumer shopping behavior". Submitted to the *American Economic Journal: microeconomics*.

Kiefer, Noémie, Rolando Leiva, Lise Rochaix, and Jean-Claude K. Dupont (n.d.). "Intensive Case Management after Severe Vocational Injuries: Impact on Work Incapacity and Costs: Evidence from Administrative Insurance Data in France". Submitted to the *Journal of Occupational Rehabilitation*.

- Marsaudon, Antoine and Josselin Thuilliez (n.d.). "Does democracy reduce the HIV epidemic? Evidence from Kenya". Submitted to the *Journal of Development Studies*.
- Proshin, Aleksandr, Alexandre Cazenave-Lacrouz, Zeynep Or, and Lise Rochaix (n.d.). "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*.
- Rochaix, Lise, Estelle Le Borgès, Corinne Grenier, and L. May (n.d.). "De la mesure de la qualité à son usage dans la regulation des systems de santé". Submitted to the *Journal de Gestion et d'Economie de la Santé*.
- Toulemon, Léa, Laurie Racht-Jacquet, and Lise Rochaix (n.d.). "Innovation Diffusion in Hospitals: Evidence from the French Add-on List for High-Cost Drugs". Submitted to *Health Policy*.
- Herrera-Araujo, Daniel and Lise Rochaix (2020a). "Competition Between Public and Private Maternity Care Providers in France: Evidence on Market Segmentation". Submitted to the special issue on 'Incentives and Market Issues in Health Care', with guest editors Randall Ellis, Albert Ma and Daniel Wiesen in the *International Journal of Environmental Research and Public Health*.
- Marsaudon, Antoine and Setti Rais (2020). "Children's Health Shock Externalities on Mothers' Health". Submitted to *Health Economics*.
- Setti, Raïs (2019). "My baby brings me down: child health shock externalities on mothers' health". Submitted to *Health Economics*.

1.6. Working papers

- Marsaudon, Antoine (2019). "Do health shocks modify personality traits? Evidence from locus of control". PSE Working Papers n2019-02. (HAL Id: halshs-01976868 <https://halshs.archives-ouvertes.fr/halshs-01976868>).
- Rais, Setti, Paul Dourgnon, and Lise Rochaix (2018). "Social Capital or Education: What Matters Most to Cut Time to Diagnosis?" PSE Working Papers n2018-01.
- Toulemon, Léa (2017). "Regional Purchasing Groups and Hospital Medicine Prices: Evidence from Group Creations". hal-01659176, Working Papers, HAL.

Barrenho, Eliana (2015). "The Economics of Healthcare Acquired Infections and the threat of antimicrobial resistance". PSE-Hospinnomics working paper series.

1.7. Hospinnomics policy briefs

Fournier, Candice, Christine Meyer, and Lise Rochaix (2019). *Recto-verso n°12, "Les restes à charge"*.

Marsaudon, Antoine and Lise Rochaix (décembre 2018). *Recto-verso n°9, "Impact d'un choc de santé sur les styles de vie"*.

Apouey, Bénédicte H. and Pierre-Yves Geoffard (août 2015). *Recto-verso n°5, "Les déterminants de la santé des enfants dans l'Hexagone : Le rôle du revenu familial et de la santé des parents"*.

Barrenho, Eliana (juillet 2015). *Recto-verso n°4, "Approche économique des infections nosocomiales et des résistances antibactériennes"*.

Fournier, Candice, Christine Meyer, and Lise Rochaix (janvier 2019). *Recto-verso n°11, "Les frais de séjour hospitaliers à charge de l'usager et de sa complémentaire : situation actuelle à l'AP-HP, enjeux de réforme"*.

Toulemon, Léa (octobre 2018). *Recto-verso n°8, "L'effet des groupements d'achat sur les prix des médicaments hospitaliers"*.

Perdrix, Elsa (avril 2015). *Recto-verso n°1, "Sport et santé : une méta-analyse"*.

Galizzi, Matteo M. (juin 2015). *Recto-verso n°3, "Carryover effects of financial incentives in health: evidence from a randomized controlled experiment"*.

Davezies, Laurent and Léa Toulemon (mars 2017). *Recto-verso n°6, "Déménager en Alsace Moselle où l'assurance maladie obligatoire est plus généreuse augmente-t-il la consommation de soins de santé ?"*.

Marsaudon, Antoine and Marlène Guillon (mai 2017). *Recto-verso n°7, "L'économie comportementale au service de la santé"*.

Lu, Ivy (mai 2015). *Recto-verso n°2, "Évaluation des dispositifs médicaux"*.

1.8. Internal working papers

Marsaudon, Antoine, Sara Machado, and Mattéo Galizzi (n.d.). "Impact of Health shocks on risk tolerance: no evidence of impact from UK panel data".

Tzintzun, Ivan (n.d.). "Heterogenous peer effects in body weight, physical activity and dietary choices: does type of peers matter?"

Barrenho, Eliana, Reka Halmi, Marisa Miraldo, Setti Raïs Ali, Lise Rochaix, and Léa Toulemon (2019). "Measuring inequalities in cancer drug development in terms of unmet medical need. Does the Orphan Drug Legislation foster R&D on rare diseases?"

Darlington, Meryl, Raffaele Scarica, Xyomara Chavez-Pacheco, Jean-Claude K. Dupont, Lise Rochaix, and Isabelle Durand-Zaleski (2019). "Improving the Health of the Population: a Systematic Review of Decrementally Cost-Effective Health Technologies".

Marsaudon, Antoine and Lise Rochaix (2019b). "Impact of physical health shocks on mental health, evidence from European panel data".

Herrerra, Daniel and Joanna Piechucka (2017). "Impact of Mergers on product repositioning: Evidence from the French Hospital Industry".

1.9. Hospinnomics' master theses

Arcelin, Thelma (2020). "The impact of unemployment on health and health behaviours: findings from the Constances cohort". MA thesis. University of Bologna.

Lee, Jeesoo (2020). "Use and data quality of electronic patient-reported outcomes (ePRO) in paediatric oncology (PO)". MA thesis. Université Paris 1 Panthéon Sorbonne.

Nedjar, Sarah (2020). "Can financial incentives attract primary care doctors and reduce emergency department visits? Evidence from France". MA thesis. Paris School of Economics.

Angliviél, Suzanne (2019). "Healthily unemployed? The impact of unemployment on health and health behaviours in Russia". MA thesis. Paris School of Economics.

Fils, Mathilde (2019). "Répondre à la demande de soins non programmés : quelle opportunité pour la mise en place d'un forfait de réorientation aux urgences ?" MA thesis. EHESP.

Medioni, Clara (2019). "L'effet de la prise de rendez-vous en ligne à l'hôpital". MA thesis. Université Paris-Dauphine.

Supplisson, Olivier (2018). "Une contribution à l'étude du lien entre passages non-contraints aux urgences hospitalières et offre de soins ambulatoires en France". MA thesis. ENSAE ParisTech.

1.10. Articles published before 2017

- Blanc, Patricia, François Doz, and Jean-Claude K. Dupont (2016). “Le développement de nouveaux médicaments en oncologie pédiatrique (aspects éthiques et industriels)”. *La revue du praticien*.
- Dupont, Jean-Claude K, Kathy Pritchard-Jones, and François Doz (2016). “Ethical issues of clinical trials in paediatric oncology from 2003 to 2013: a systematic review”. *The Lancet Oncology* 17.5, e187–e197.
- Herrera-Araujo, Daniel (2016). “Folic acid advisories: a public health challenge?” *Health economics* 25.9, pp. 1104–1122.
- Marsaudon, Antoine and Josselin Thuilliez (2016b). “Les liens entre régime politique et lutte contre le VIH/SIDA : le cas du Kenya”. *Association française des sciences économiques (billet de blog)*.
- Raimond, Véronique, Fabienne Midy, Clémence Thébaut, and Catherine Rumeau-Pichon (2016). “L’évaluation économique des produits de santé innovants: quelle interprétation pour quel usage?” *Revue française des affaires sociales* 3, pp. 263–281.
- Rheinberger, Christoph M, Daniel Herrera-Araujo, and James K Hammitt (2016). “The value of disease prevention vs treatment”. *Journal of health economics* 50, pp. 247–255.
- blog, Health Affairs (2015). “Incorporating cost-effectiveness analysis into comparative-effectiveness research: the French experience”.
- Davezies, Laurent and Léa Toulemon (2015). “Does moving to a system with a more generous public health insurance increase medical care consumption?” *Annals of Economics and Statistics/Annales d’Économie et de Statistique* 119/120, pp. 179–205.
- Guo, Jean, 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* 33.10, pp. 1235–1242.
- Hirsch, Martin and Lise Rochaix (2015). “L’hôpital du futur”. *Lettre de PSE / The Conversation*.
- Midy, Fabienne, Véronique Raimond, Clémence Thébaut, Cléa Sambuc, and Catherine Rumeau-Pichon (2015). “Avis d’efficience relatifs aux produits de santé à la Haute Autorité de santé: bilan et perspectives”. *Santé publique* 27.5, pp. 691–700.

- Camejo, Rodrigo Refoios, Clare McGrath, Marisa Miraldo, and Frans Rutten (2014). "Distribution of health-related social surplus in pharmaceuticals: an estimation of consumer and producer surplus in the management of high blood lipids and COPD". *The European Journal of Health Economics* 15.4, pp. 439–445.
- Raimond, Véronique, Jean-Michel Josselin, and Lise Rochaix (2014). "HTA agencies facing model biases: the case of type 2 diabetes". *Pharmacoeconomics* 32.9, pp. 825–839.
- Wheelock, Ana, Anam Parand, Bruno Rigole, Angus Thomson, Marisa Miraldo, Charles Vincent, and Nick Sevdalis (2014). "Socio-psychological factors driving adult vaccination: a qualitative study". *PLoS One* 9.12, e113503.

2. Presentations

- Dupont, Jean-Claude K. (novembre 2019). "Les « bénéfiques » du séquençage : quelle(s) question(s) de recherche ?" Workshop EcoGen. Dijon, France.
- Dupont, Jean-Claude K. (octobre 2019[a]). "Parenting a child with malignancies: what do we know about the impact on professional and financial situation?" SIOF Congress 2019. Lyon, France.
- Dupont, Jean-Claude K. (octobre 2019[b]). "What's next? Should next generation sequencing in healthcare lead us to reassess basic ethical concepts guiding practices in research?" SIOF Congress 2019. Lyon, France.
- Dupont, Jean-Claude K. (septembre 2019). "Mesures de résultats et qualité de vie en oncologie pédiatrique : état des lieux et questionnements". Réseau qualité de vie et cancer. Nantes, France.
- Dupont, Jean-Claude K. (mars 2019[a]). "Nourrir, se nourrir, mourir de faim... : un regard philosophique". Hôpital Necker / Université de Paris, DU 'Ethique et situations complexes en néonatalogie). Paris, France.
- Dupont, Jean-Claude K. (mars 2019[b]). "Les parents d'enfants malades, leur situation matérielle et professionnelle : que sait-on ?" Colloque cancer et travail, réseau sciences humaines et sociales cancéropôle Grand Ouest.

- Dupont, Jean-Claude K. (juin 2018). "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, France.
- Dupont, Jean-Claude K., Clémence Thébaud, and Jérôme Wittwer (juin 2018). "Éthique et économie de la santé : quels enjeux actuels ? Contribution aux débats menés à l'occasion des États généraux de la bioéthique 2018". Colloque de l'Espace de réflexion éthique de Bretagne (EREB) La proportionnalité en santé. Université Paris Dauphine, France.
- Dupont, Jean-Claude K. (avril 2018). "Les limites de l'évaluation". Séminaire Soins et compassion, (Chaire de Philosophie AP-HP-ENS). Hôtel-Dieu, France.
- Dupont, Jean-Claude K. (mars 2018). "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). Brest, France.
- Dupont, Jean-Claude K. (décembre 2017). "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, France.
- Dupont, Jean-Claude K. (octobre 2017). "Ethical issues in paediatric cancer". SIOP Annual Congress. Washington D.C., Etats-Unis.
- Herrera-Araujo, Daniel (2018a). Collège des économistes de la santé. Paris, France.
- Herrera-Araujo, Daniel (2018b). Workshop on Environmental Economics and Natural Resources. Rennes, France.
- Herrera-Araujo, Daniel (2018c). 9th European Health Economics Workshop. Paris, France.
- Herrera-Araujo, Daniel (2018d). Society for benefit cost analysis. Washington D.C., Etats-Unis.
- Herrera-Araujo, Daniel (2018e). 67th International Congress of the AFSE. Paris, France.
- Herrera-Araujo, Daniel (décembre 2017). Journées des Economistes de la Santé Français. Marseille, France.
- Herrera-Araujo, Daniel (novembre 2017). Journées de l'économie. Lyon, France.
- Herrera-Araujo, Daniel (septembre 2017[a]). Health Econometrics and Data Group. Prague, République Tchèque.

Herrera-Araujo, Daniel (septembre 2017[b]). 4th European Health Economic Association PhD Student-Supervisor. Lausanne, Suisse.

Marsaudon, Antoine (juin 2019). "Do health shocks modify personality traits? Evidence from locus of control". 34ème journée de l'association de l'économie de la santé. Albacete, Espagne.

Marsaudon, Antoine and Setti Rais (mai 2019). "Child health shock externalities on mothers' health. Evidence from Scotland". Séminaire interne à PSE. Paris, France.

Marsaudon, Antoine and Setti Rais (avril 2019). "Child health shock externalities on mothers' health". WIP seminar. Paris, France.

Marsaudon, Antoine (2018b). Health Economists' Study Group. Londres, Royaume-Uni.

Marsaudon, Antoine (2018c). 2ème journée doctorale du LIRAES. Paris, France.

Marsaudon, Antoine (2018d). Doctorissimes, Université Paris 1. Paris, France.

Marsaudon, Antoine (2018e). 9th Australasian Workshop on Econometrics and Health Economics. Australie.

Marsaudon, Antoine (2018f). Work in Progress - PSE Seminar. Paris, France.

Marsaudon, Antoine (2018g). 9ème Ecole Thématique CNRS Evaluation des Politiques Publiques. Aussois, France.

Proshin, Aleksandr (mai 2019). RLMS-user conference. Moscou, Russie.

Proshin, Aleksandr (juin 2018[a]). Canadian Economics Association Conference. Montréal, Canada.

Proshin, Aleksandr (juin 2018[b]). International Association for Applied Econometrics Conference. Montréal, Canada.

Proshin, Aleksandr (mai 2018). Warwick PhD conference. Warwick, Royaume-Uni.

Rais, Setti (octobre 2018). PSI PSE Seminar. Paris, France.

Rais, Setti (septembre 2018). 5th EuHEA-PhD conference. Catane, Italie.

Rais, Setti (juillet 2018). European Health Economics Association (EuHEA). Maastricht, Pays-Bas.

Rais, Setti (avril 2018). 67th International Congress of the AFSE. Paris, France.

Rais, Setti (mars 2018). Work in Progress, PSE Seminar. Paris, France.

Rochaix, Lise (mai 2020). Séminaire Covid PSE. Paris, France.

Rochaix, Lise (juillet 2020). EuHEA digital conference.

Rochaix, Lise (décembre 2019). Health Tech Paris. Paris, France.

Rochaix, Lise (novembre 2019). EHES, réformes systèmes de santé. Marseille, France.

Rochaix, Lise (septembre 2019[a]). Colloque JGES, 'rémunération à la qualité'. Paris, France.

Rochaix, Lise (septembre 2019[b]). SNITEM. Paris, France.

Rochaix, Lise (septembre 2019[c]). EuHEA PhD Workshop. Porto, Portugal.

Rochaix, Lise (juillet 2019). Closing panel iHEA. Bâle, Suisse.

Rochaix, Lise (mai 2019). EHEW discussion paper. Vérone, Italie.

Rochaix, Lise (janvier 2019[a]). 2nd IMPACT-HTA meeting. Varsovie, Pologne.

Rochaix, Lise (janvier 2019[b]). Ostéoporosis. Lille, France.

Rochaix, Lise (décembre 2018[a]). Health and Tech. Paris, France.

Rochaix, Lise (décembre 2018[b]). CES. Paris, France.

Rochaix, Lise (novembre 2018[a]). ATIH. Paris, France.

Rochaix, Lise (novembre 2018[b]). JECO. Lyon, France.

Rochaix, Lise (octobre 2018). Giens.

Rochaix, Lise (septembre 2018[a]). Radio France Culture, Du Grain A Moudre.

Rochaix, Lise (septembre 2018[b]). EAHM, hospital efficiency. Lisbonne, Portugal.

Rochaix, Lise (septembre 2018[c]). Small area variations. Scipion, France.

Rochaix, Lise (septembre 2018[d]). EuHEA PhD Workshop. Catane, Italie.

Rochaix, Lise (août 2018). Paris Saclay entreprises. Paris, France.

Rochaix, Lise (juillet 2018). EuHEA Conference. Maastricht, Pays-Bas.

Rochaix, Lise (juin 2018[a]). Colloque JGEM télémédecine. Paris, France.

Rochaix, Lise (juin 2018[b]). MG France. Paris, France.

Rochaix, Lise (juin 2018[c]). Cour des Comptes. Paris, France.

Rochaix, Lise (mai 2018[a]). PSE, France Stratégie. Paris, France.

Rochaix, Lise (mai 2018[b]). EHEW. Paris, France.

Rochaix, Lise (avril 2018). Matinée CES article 51. Paris, France.

Rochaix, Lise (mars 2018[a]). France Stratégie. Paris, France.

Rochaix, Lise (mars 2018[b]). ADD. Paris, France.

Rochaix, Lise (novembre 2017[a]). Journées de l'Economie. Lyon, France.

Rochaix, Lise (novembre 2017[b]). Conférence annuelle de la HAS. Paris, France.

Rochaix, Lise (octobre 2017). Conférence annuelle du Conseil National de l'Ordre des Médecins. Paris, France.

Roquebert, Quitterie (juillet 2018). 12th EuHEA Conference. Maastricht, Pays-Bas.

Roquebert, Quitterie (mai 2018). 67th Annual Meeting of the l'Association française de Science Economiques. Paris, France.

Roquebert, Quitterie (septembre 2018). 5th International Conference on Evidence-based Policy in Long-term Care. Vienne, Autriche.

Roquebert, Quitterie (novembre 2017). 39e Journées des Economistes de la santé française. Marseille, France.

Sanchez, Marc-Antoine (novembre 2017). 39e Journées des Economistes de la santé française. Marseille, France.

Toulemon, Léa (septembre 2018). 5th EuHEA-PhD conference. Catane, Italie.

Toulemon, Léa (janvier 2018). External seminar, Groupe d'Analyse et de Théorie Economique. Lyon, France.

Toulemon, Léa (septembre 2017). Health Econometrics and Data Group. Prague, République Tchèque.

3. Teaching

Rochaix, Lise (2020). "Global Health Economics". M1 Sciences Po, Paris.

Rochaix, Lise (9 avril 2019). "Pertinence". EN3S, Paris.

Rochaix, Lise (11 juin 2019). "Tracy Reagan". Carine Milcent.

Rochaix, Lise (16 septembre 2019). "Réformes des systèmes de santé". IHF, Paris.

Rochaix, Lise (9 septembre 2019). EN3S, Paris.

Dupont, Jean-Claude K. (n.d.[a]). Tuteur des mémoires universitaires des étudiants, IUT Descartes.

Dupont, Jean-Claude K. (n.d.[b]). Encadrement de mémoires universitaires, Master d'éthique, Paris Descartes, EA ETREs.

Dupont, Jean-Claude K. (n.d.[c]). Accompagnement méthodologique de mémoires, Institut Curie, Paris.

Dupont, Jean-Claude K. (n.d.[d]). Interventions dans des séminaires de 3e cycle-DEA sur des thèmes de philosophie juridique.

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VII. Staffing and PhD students

1. Staffing

1.1. Contracted staff

In 2017, Christine Meyer joined Hospinnomics to work on some of the stakeholders'-initiated priorities, such as hospital out-of-pocket reforms or innovative payment schemes and to help promoting Hospinnomics' productions and activities.

Research staff has included **Maria Porras** worked at Hospinnomics between January 2018 and July 2019 as project-manager, working on PIC-R and several other projects (esp. AMBU-ENDO, ROSIE); Maria was part-time with the J-PAL; **Estelle Le Borgès** on the MOOC (December 2017 - August 2018), **Rolando Leiva** on IMPACT-HTA and on the AE project (September. 2018 – December 2019); **Lorène Jacoud** was part time research assistant from February. 2018 until December 2019 on the CRISTAL-IMAGE project (part-time student at École Normale Supérieure). **Candice Fournier** was part-time research assistant following her internship in the summer 2017 from Sept. 17 to July 18; she worked with Christine Meyer on the hospital Out of Pocket study. **Bastien Tourenc** was research assistant from November 2018 to March 2019 to work on the Physical Activity project and **Caroline Ras** worked on the ROSIE project from January 2020 to July 2020. 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 Halmai (4M Hospinnomics intern, INCa project), **Olivier Supplisson** (2M Hospinnomics intern, AE project), and **Olivier Supplisson** (M1, 6 weeks interns), Maria José Gonzalès (2M), **Mickaël Sixdenier** and **Solène Blanc** (3M) in the summer 2020.

Current staff includes **Emelie Lindström** who joined the team in June 2019 as project

manager to work on the IMPACT-HTA European project, **Thomas Pelloquin** (from Paris 1) who started as project manager in December 2019. Master's degrees (M2) graduates were recently hired as research assistants: **Faustine Emmanuel**, **Jesoo Lee**, **Thelma Arcelin** and **Lucie Sabin**.

The growing number and higher level of the applications received confirms, from one year to the next, the attractiveness of the Chair to young graduates interested in both academic research and decision support. More information on the permanent staff is available in the appendix.

1.2. Affiliates and visitors

The team has been enriched over time with the affiliation of senior researchers to the Hospinnomics Chair. Some of these affiliated researchers have spent some time at Hospinnomics, while others work closely with the team on several projects. Visitors included Pr. **Audrey Laporte** from Toronto University for a sabbatical term in the fall 2018. Pr. **James Robinson**, from U. of Berkeley visited Hospinnomics with a seminar on biosimilars and planned a sabbatical term in the 2020 fall which had to be postponed, due to the pandemic.

These affiliated researchers are: **Bénédicte Apouey** (CNRS/PSE), **Marc Bardou** (CHU Dijon Bourgogne), **Eliana Barrenho** (OECD), **Luc Baumstark** (Commissariat Général à l'Investissement), **Valérie Clément** (Université de Montpellier), **Benoit Dervaux** (CHU Lille), **Paul Dourgnon** (IRDES), **Fabrice Etilé** (PSE), **Mattéo Galizzi** (LSE), **Philippe Gorry** (Université de Bordeaux), **Laurence Hartmann** (CNAM), **Hélène Huber** (Université Paris 1/PSE), **Izabela Jelovac** (CNRS), **Jean-Michel Josselin** (Université Rennes 1), **Christine Le Clainche** (Université de Lille), **Grégoire Mercier** (Université de Montpellier), **Marisa Miraldo** (Imperial College Business School, London), **Antoine Nebout** (INRA), **Grégory Ninot** (Université de Montpellier), **Zeynep Or** (IRDES), **Erwann Paul** (CHU de Caen), **Lionel Perrier** (Centre Léon Bérard), **Thomas G. Poder** (Université de Montréal), **Thomas Rapp** (LIRAES), **Silvana Robone** (Université d'Insubria), **Vandana Sharma** (Harvard T.H. Chan School of Public Health) and **Sandy Tubeuf** (Université Catholique de Louvain).

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.

2.1. Completed Post-docs

After two and a half years at Hospinnomics as post-doctoral fellows, [Daniel Herrera](#) has been appointed assistant professor at Paris Dauphine and [Léa Toulemon](#) economist at the Institute of Public Policies (IPP) at PSE. [Antoine Marsaudon](#) completed his 10 months postdoctoral contract in February 2020 and is now research fellow at the Institute for Research and Innovation in Health Economics (IRDES). [Setti Raïs](#) completed her 10 months Postdoc in April 2020 funded by the IMAGINE Institute.

2.2. PhDs

- [Véronique Raimond](#) completed her PhD on December 20th, 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 5th, 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.
- [Antoine Marsaudon](#) completed his PhD at the Paris School of Economics on July 3rd, 2019 on behavioral economics applied to health. His thesis title was Impact of

Health Shocks on Personality Traits, Economic Preferences, and Risky Behaviors. The doctoral studies were partly funded by Hospinnomics and partly by IRESP. Supervisors: **Lise Rochaix** (Paris 1, PSE – Hospinnomics) and **Matteo Galizzi** (LSE); Thesis committee members: Andrew Jones, Marjon van der Pol; Nicolas Jacquemet; Andrew Clark.

- **Setti Ali Raïs** completed her PhD at the on July 3rd, 2019 on the ‘Impact of public policies on the diagnostic and therapeutic delays for rare disease patients’. Her thesis title was: “Diagnostic and therapeutic odyssey: essays in health economics”. Funding was obtained from the French rare diseases Institute IMAGINE. Supervisors: **Lise Rochaix** and **Sandy Tubeuf** (Leeds – now Université Catholique de Louvain). Thesis committee: Philippe Aghion, Margaret Kyle, Frank Lichtenberg, Pierre-Yves Geoffard, Jérôme Wittwer.
- **Aleksandr Proshin**, in his fourth 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). He will defend his thesis at the Paris School of Economics at the end of 2020.
- **Ivan Tzintzun**, in his fourth year, works on behavioral economics, in particular on obesity. The topic of the thesis is “Social Networks, Time Preferences and Market Failures: Three Essays on Health Economics”. Supervisors: **Lise Rochaix** and **Marc-Arthur Diaye** (University of Paris 1). He obtained a doctoral grant from the Mexican government. He will defend his thesis in 2020.
- **Marc-Antoine Sanchez** started his PhD training in 2017 under the joint supervision of **Thomas Barnay** (UPEC) and **Lise Rochaix**.
- **Sarah Nedjar** will start her PhD in October 2020 under the joint supervision of **Lise Rochaix** and **Nicolas Sirven** (EHESP). She obtained a PhD grant from EHESP and her thesis will focus on hospital staff working conditions.

2.3. Completed masters

Since 2017, several students graduated with an internship at Hospinnomics, whether from ENSAE and HEC (**Candice Fournier**, **Olivier Supplisson**), Paris 1/PSE (**Rolando Leiva**, **Suzanne Angliviel**) Paris Saclay (**Réka Halmai**). Over the years, the pool of students

for master dissertations has widened to include EHESP, with a master dissertation from **Mathilde Fils** on the reform of access to AE departments and the management sciences at University of Paris 1 with **Jeesoo Lee** who wrote her Master dissertation under the supervision of **Jean-Claude K. Dupont**. **Thelma Arcelin** graduated from the European master's in health economics and Management after a 6-months internship at Hospinnomics between January and June 2020. **Suzanne Angliviel** (2019) and **Sarah Nedjar** (2020) graduated from the M2 APE at the Paris School of Economics. **Olivier Supplisson**, student at HEC, started a second internship in April 2020 (following his first experience in 2018) as part of his gap year and will work on the Equirac project for his HEC master thesis.

2.4. Staff training

As part of the IMPACT HTA, in November 2019, **Emelie Lindström** participated in a three-day training course on discrete choice experiment (DCE) at the University of Aberdeen, Health Economics Research Unit. The course introduced the theoretical basis for and development and application of discrete choice experiments and gave hands-on experience of the design of DCEs, including questionnaire development, data input, analysis and interpretation. In Emelie's own words, "I now feel more confident in using Discrete Choice Experiment, and the method has been demystified".

2.5. 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 until 2017, **Laurie Rachet-Jacquet** is now completing her PhD at the University of York, with a grant from the Marie Curie European network, under Luigi Siciliani's supervision. **Rita Abdelsater** also obtained a PhD grant from Paris townhall to work at Sc. Po on environment/health issues using behavioral economics (nudges). **Rolando Leiva** is now registered for a PhD at University College London, UK.

Appendices

Table 1 – Contracted staff over the 2017 – 2020 period

Name	Time spent at Hospinnomics	Position/Role	Projects
Maria Porras	January 2018 – July 2019	Project manager	PIC-R, AMBU-ENDO, ROSIE
Emelie Lindström	June 2019 - present	Project manager	IMPACT-HTA
Thomas Pelloquin	December 2019 – present	Project Manager	BOOSTER, EDS
Estelle le Borgès	December 2017 – August 2018	Research assistant	MOOC
Rolando Leiva	September 2018 – December 2019	Intern (PSE), then research assistant	IMPACT-HTA, A&E
Lorène Jacoud	February 2018 – December 2019	Research assistant	CRISTAL-IMAGE
Candice Fournier	September 2017 – July 2018	Research assistant	Hospital OOP
Bastien Tourenc	November 2018 – March 2019	Research assistant	Physical activity
Caroline Ras	January 2020 – July 2020	Research assistant	ROSIE
Faustine Emmanuel	March 2020 – present	Research assistant	ROSIE
Jeesoo Lee	March 2020 – present	Research assistant	PREMS/PROMS
Clara Medioni	June 2019 – February 2020	Intern, then research assistant	PRDVEL
Thelma Arcelin	January 2020 – present	Intern (Eu-HEM), then research assistant	Constances, Imagine, SEQOIA
Lucie Sabin	April 2020 - present	Intern (Paris 1), then research assistant	RESISTE
Camille Luya-Guedj	September 2017 – March 2018	Intern (Paris 1)	PRDVEL
Réka Halmai	March 2018 – August 2018	Intern (Paris 1)	INCa
Olivier Supplisson	June 2018 – September 2018; April 2020 – August 2020	Intern (ENSAE Paris and HEC Paris)	A&E; EQUIRAC, EFFIHOSP, DODKs
Naphat Sattayut	October 2019 – April 2020	Intern (Paris 1)	DRUG REGULATION
Léa Dumoulin	June 2018 – July 2018	Intern (Magistère Paris 1)	DRUG REGULATION
Maria-José Gonzales	May 2020 – July 2020	Intern (M1 APE, PSE)	Data-Covid
Solène Blanc	May 2020 – August 2020	Intern (Magistère Paris 1)	EQUIRAC, DODKs
Mickael Sixdenier	May 2020 – August 2020	Intern (Magistère Paris 1)	EQUIRAC, DODKs