

Fiction and facts: Socio-economic and financial impacts of EHR systems & eHealth innovations

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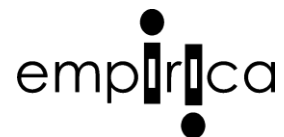
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Outline

1. What are the issues?
2. Policy expectations and “scientific” predictions
3. Empirical evidence – a benefit/cost approach
4. Two cases:
 - Geneva University Hospitals (HUG)
 - NorthShore University HealthSystem, Evanston, IL (Chicago), USA
5. Summary results of EHR system socio-economic impacts
6. Success factors

What are the issues?

- Trustworthiness of policy statements and predictions
- Socio-economic versus financial returns
- Benefits and costs for whom?
- Integration and interoperability of diverse systems and applications
- Sustainability and long-term perspective

Policy expectations (I)

- ✓ “e-Health systems and services combined with organisational changes and the development of new skills ... can deliver **significant improvements in access to care, quality of care, and the efficiency and productivity** of the health sector. “
- ✓ “eHealth systems and services can **reduce costs and improve productivity** in such areas as i) billing and record-keeping, ii) reduction in medical error, iii) alleviation of unnecessary care, and iv) savings achieved by business-to-business e-commerce.”

European Commission, eHealth Action Plan 2004, pp. 6-7

Policy expectations (II) & predictions

- “There is a significant healthcare improvement potential using eHealth as a catalyst. The **potential improvements are of such magnitude** that they demand both attention and action from all member states”:
- “9 million bed-days **yearly** could be freed up through the use of Computer-Based Patient Records, an opportunity for either increasing throughput or decreasing waiting times, corresponding to a value of **nearly €3,7 billion.**”

Gartner (prepared for the Swedish Presidency of the European Union): eHealth for a Healthier Europe! – opportunities for a better use of healthcare resources. 2009

Predictions (II)

- Exemplary prospective study on the value of EMR systems on the Partners HealthCare ambulatory EHR system
- Five-year total benefits of an EHR implementation were estimated to be \$129,300 per provider (in 2002 dollars), or a **net savings of \$86,400 per provider** (in 2002 dollars).
- The net financial value could range from a \$2,300 net cost to a \$330,900 net benefit per provider

Wang, S. J., et al., A Cost–Benefit Analysis of Electronic Medical Records in Primary Care. *American Journal of Medicine*, vol. 114, no. 5 (April 1), 2003, 397–403

Predictions (III)

- **Value of information exchange between health IT systems in hospitals and clinics.**
- **Investment in a fully standardized, Level-4 nationwide system will have the most financial return,**
- **A net value of \$77.8 billion per year once fully implemented.**

Walker, J. et al., The Value of Health Care Information Exchange and Interoperability, Health Affairs, 19 January 2005

Benefits assessment

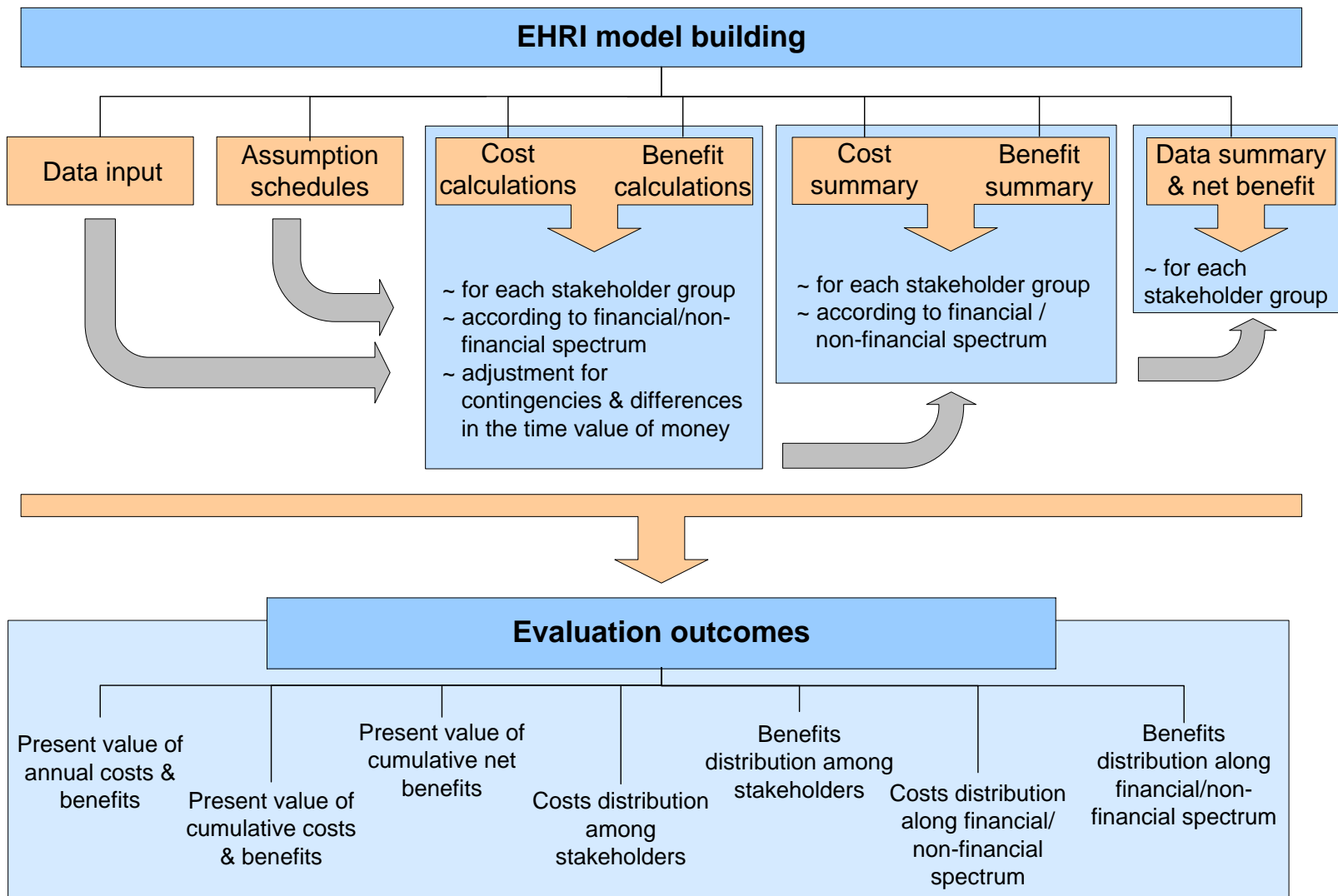
Empirical evidence – a benefit/cost approach

- **Theoretical foundation is Benefit-Cost Analysis**
(UK Treasury's Green Book or Germany's WiBe approach)
- **Empirical data from more than 20 site visits**
 - Interviews & expert estimates from some 500 people across all sites; accounting data
 - Complemented by data published in the literature
- **Data items**
 - 1,300 time series variables
 - 600 estimates and assumptions
- **Socio-economic impact indicators**
 - 300 cost functions
 - 425 benefit functions

Supporting Tools

- Assigning **monetary values** to benefits
 - Actual prices or proxies
 - Time savings and costs of Full Time Equivalent (FTE)
 - Willingness to pay approach
- **Adjustment for contingencies** for unaccounted costs and optimism bias
- **Time value of money**: Present value / discounted cash flow
- **Sensitivity analysis** (by overvaluing costs, undervaluing benefits) to test for robustness

Assigning monetary values to benefits and costs



Data summary sheet

<i>EHRI generic data summary</i>	2002	2003	2004	2005	2006	2007	2008	2009	2010	total
	£	£	£	£	£	£	£	£	£	£
Estimated COSTS										
<i>Citizens</i>	0	0	0	0	0	0	0	0	0	0
<i>HPOs</i>										
Doctors, nurses, other staff	327.228	1.580.810	3.054.706	2.508.696	2.138.701	1.377.585	665.500	257.198	248.501	
Organisation	0	287.420	1.278.054	1.456.266	1.647.159	1.168.186	1.573.382	1.491.935	1.124.750	
<i>3rd parties</i>	0	0	0	0	0	0	0	0	0	0
Present value of total annual costs	327.228	1.868.231	5.001.766	4.574.757	4.846.373	2.944.246	2.480.882	2.011.114	1.624.832	25.679.427
Present value of cumulative costs	327.228	2.195.458	7.197.224	11.771.981	16.618.354	19.562.600	22.043.482	24.054.596	25.679.427	
Estimated BENEFITS										
<i>Citizens</i>	0	0	49.522	139.721	235.032	954.462	1.881.438	2.253.439	2.403.204	
<i>HPOs</i>										
Doctors, nurses, other staff	0	0	22.610	693.547	786.336	978.257	989.644	963.139	935.856	
Organisation	0	0	50.246	146.426	248.257	1.016.342	2.003.123	2.374.555	2.513.962	
<i>3rd parties</i>	0	0	0	0	0	0	0	0	0	0
Present value of annual benefits	0	0	122.378	979.694	1.269.625	2.949.061	4.874.205	5.591.132	5.853.022	21.639.117
Present value of cumulative benefits	0	0	122.378	1.102.072	2.371.697	5.320.758	10.194.963	15.786.095	21.639.117	
Net benefits										
Present value of annual net benefits	-327.228	-1.868.231	-4.879.388	-3.595.063	-3.576.747	4.814	2.393.323	3.580.018	4.228.191	-4.040.310
Present value of cumulative net benefits	-327.228	-2.195.458	-7.074.846	-10.669.909	-14.246.657	-14.241.842	-11.848.519	-8.268.501	-4.040.310	
Net benefits over cost ratio - annual	-1,00	-1,00	-0,98	-0,79	-0,74	0,00	0,96	1,78	2,60	-0,16
Net benefits over cost ratio - cumulative	-1,00	-1,00	-0,98	-0,91	-0,86	-0,73	-0,54	-0,34	-0,16	
Number of records	4.800.000	4.900.000	5.000.000	5.100.000	5.200.000	5.450.914	5.450.914	5.450.914	5.450.914	
Number of times records are accessed	0	0	12.600	37.260	72.720	792.120	1.455.996	1.740.240	1.920.240	
Distribution of benefits										
<i>Citizens</i>			40,47%	14,26%	18,51%	32,36%	38,60%	40,30%	41,06%	36,59%
<i>HPOs</i>										
Doctors, nurses, other staff			16,10%	63,85%	57,82%	32,05%	20,30%	17,83%	17,13%	24,81%
Health provider organisation			35,78%	13,48%	18,25%	33,30%	41,10%	43,96%	46,01%	38,60%
<i>3rd parties</i>			0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Base year: 2008; Discount rate:	3,5%									

Two cases:

- **Geneva University Hospitals (HUG)**
- **NorthShore University HealthSystem, Evanston, IL (Chicago), USA**

Costs and financing

- **Investment** contributions from the state (40m)
- **Operational** and maintenance costs born by HUG
- **(Immaterial) implementation** costs, including users' time
- **Extra time** spent on ward rounds by doctors
- **Omitted income** from avoided admissions

Interoperability across applications and hospitals - A key enabler

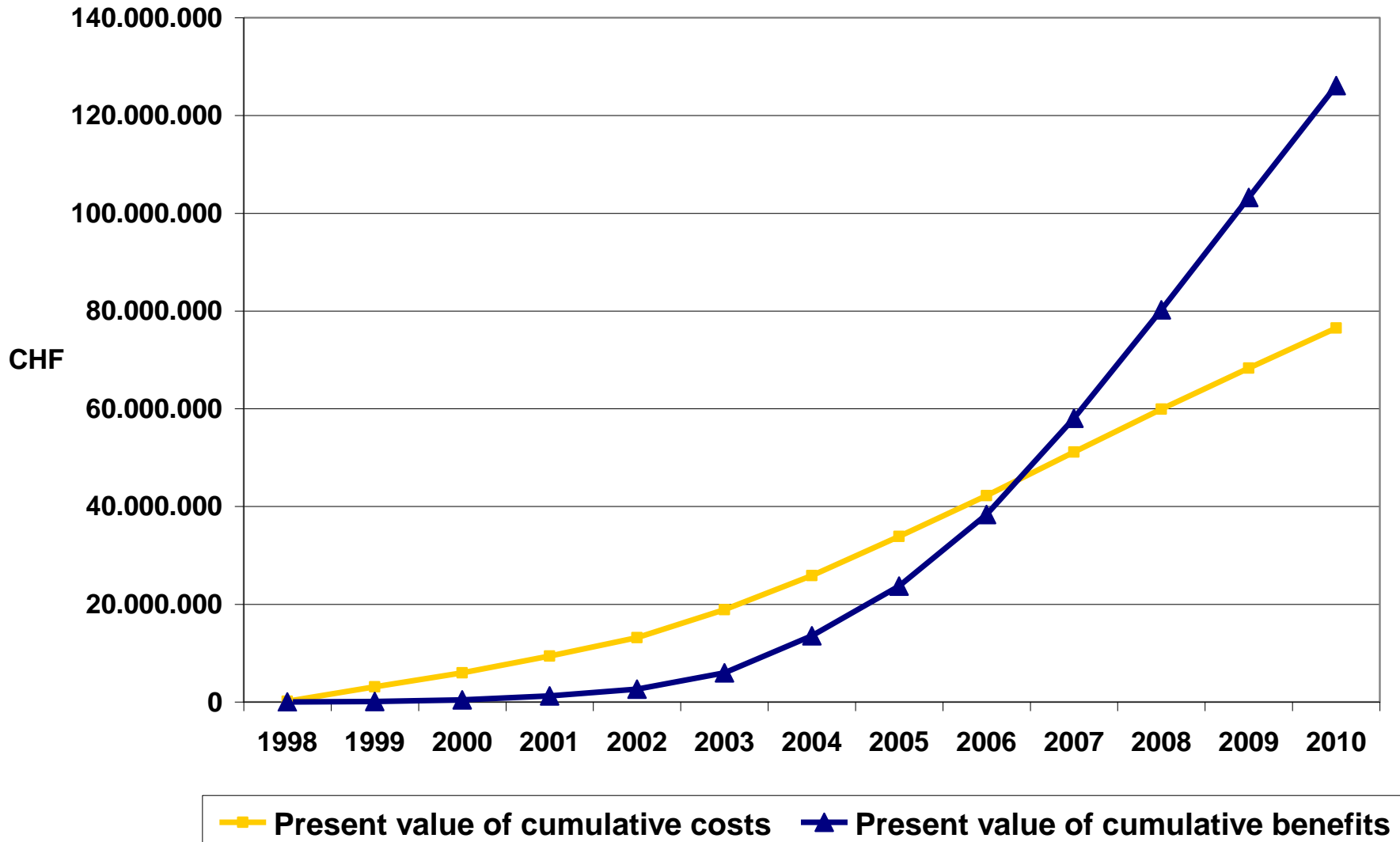
Benefits

- **Citizens**
 - Patient safety
 - Time saving and avoided admissions
 - Better care because of better informed carers
- **Doctors & nurses**
 - Do not have to waste time looking for records
 - Lower exposure to risk – carers feel safer, less vulnerable
 - Nurses do not have to chase doctors
 - Doctors do not have to guess while waiting for data
 - Life made easier through integrated presentation of different reports

Benefits from the CPR system at HUG

- Benefits to HUG
 - **Time savings** – redeployment of resources:
 - Looking for records
 - Looking for colleagues
 - *Ward rounds*
 - Discharge letters
 - **Reduction in exposure to risk** due to better clinical governance
 - Critical information is always available where needed
 - Lower risk of errors when transferring patients across HUG sites
 - **Avoided admissions – also for insurances**
 - Reductions in number of tests
 - Extra income from better billing processes

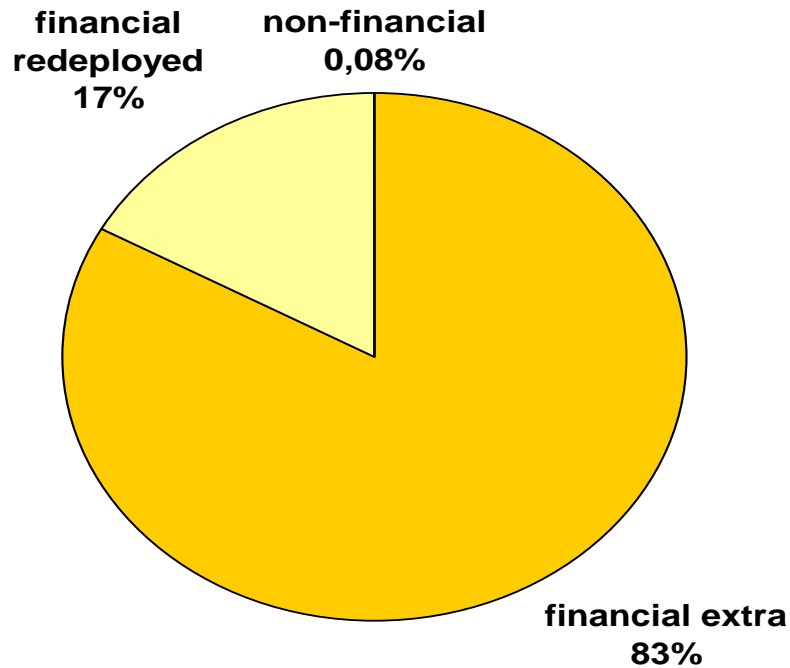
HUG – cumulative *economic* performance



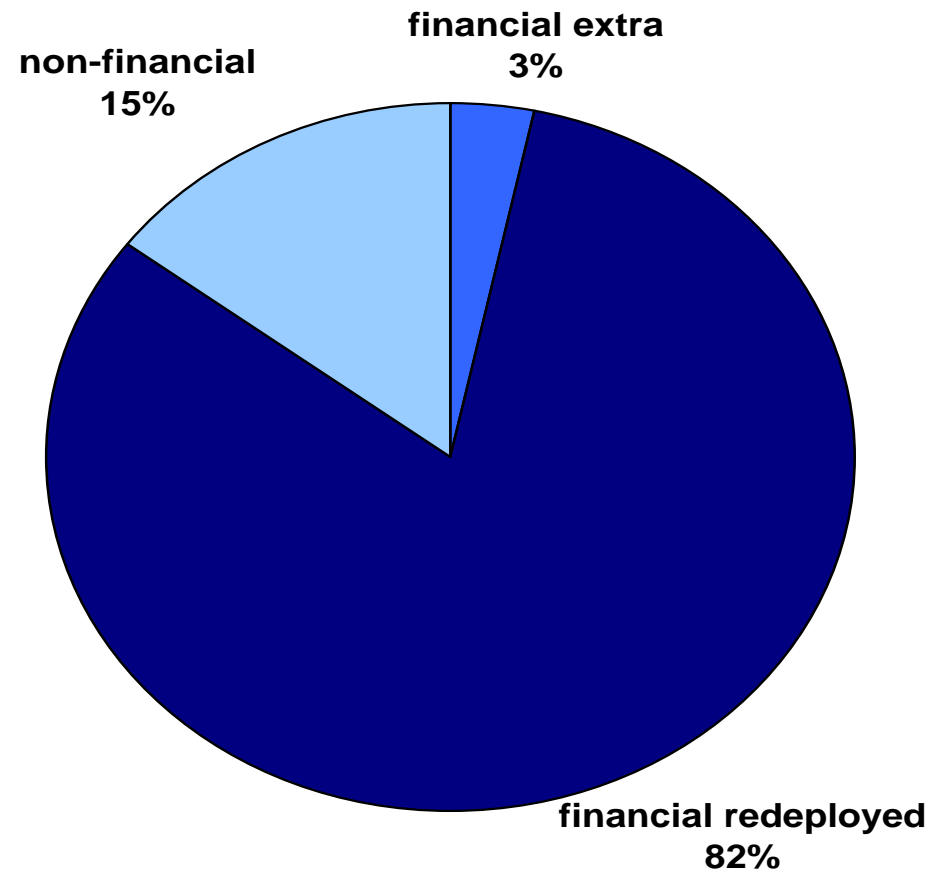
Preliminary data

Distribution of costs and benefits: financial versus socio-economic impact

Costs

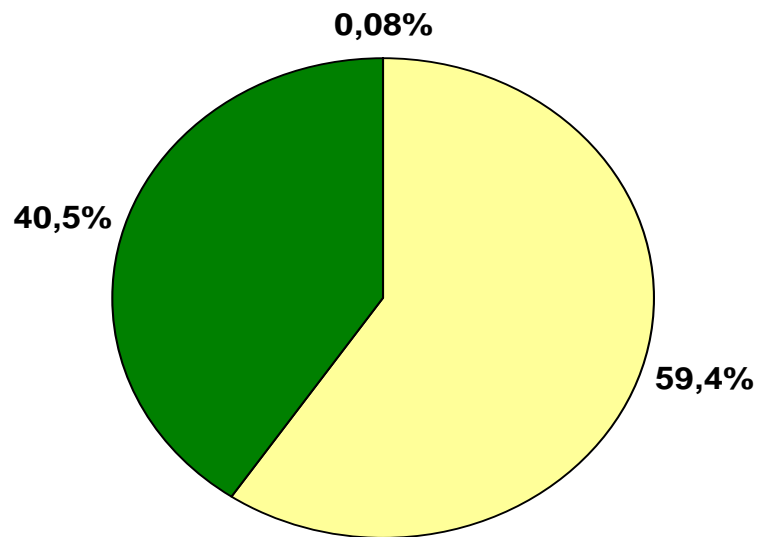


Benefits

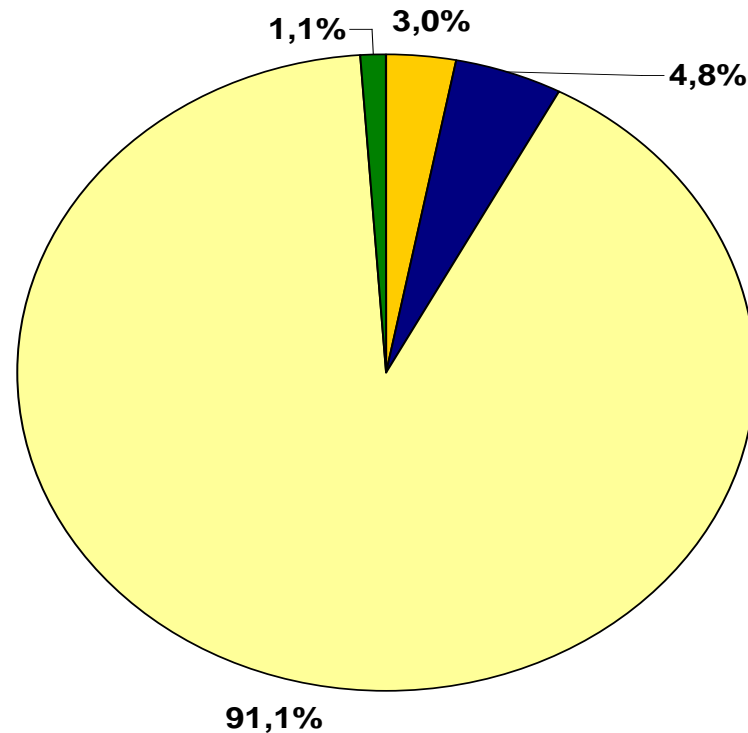


Distribution of costs and benefits

Costs



Benefits



■ Citizens

■ Doctors, nurses, other staff

■ Organisation

■ 3rd parties

Preliminary data

NorthShore University HealthSystem, Evanston, IL (Chicago), USA

Benefits – Patient safety

- **Patient safety and medication management**
 - The new (EPIC) system helped to eliminate entire categories of errors and near-misses, including transcription errors, errors due to misunderstood abbreviations and mix-ups due to look-alike drug names. Errors and near-misses caused by transcription errors, which represented 42 percent of total errors before system implementation, were eliminated altogether
 - Time from order to administration of first dose antibiotics was reduced from 160 to 80 minutes

Benefits – Reduced patient visit time & financial

■ INPATIENT AND OUTPATIENT VISITS

- Shortened inpatient diagnostic and treatment cycles, as indicated by shortened length of stay for several diagnostic groupings (But: loss in income, made up through growth)

■ Record accuracy and financial performance

- Improved record accuracy and completeness helped improve overall billing and reduce billing denial rate to drop from 23% to 10%
- The returned mail rate dropped from five percent to zero percent
- Improvements were also seen in several financial metrics. E.g., the co-pay collection rate increased from 21 percent to 50 percent

Benefits – Risk management, staffing

- ✓ **Proactive risk management**
 - Information on a drug side effect was transferred into changes of all affected 32 order sets and 22 preference lists in just three hours
 - Through the system, it notified every clinician of the change
- ✓ **Retention and recruitment of talented staff**
 - Staffing became easier, more competitive as an employer

Direct financial benefits

- ✓ **Staff-related reductions** (dictation expense saved, scanning of documents avoided, greater volume of billable activities with same staff, physician billing office savings, etc.) about \$8m
- ✓ **Increased hospital charge capture** (now linked to order entry, improved coding edits): additional revenues of \$2.7m
- ✓ **Other computer systems eliminated, reductions in usage of forms** \$2m
- ✓ **altogether to overall direct financial benefits of about \$12.5m**

More financial benefits

- ✓ **Growth in business:** referrals from new physicians who wanted to work with EMRs
- ✓ In May 2008 Moody's Investors Service **upgraded NorthShore's bond rating** to Aa2
 - \$597m of outstanding bonds
 - Among the arguments were these: "The medical group has grown 10% since 2006. Importantly, Evanston has aligned more closely with the physicians through its advanced information technology strategy, which has enabled electronic medical records and centralized scheduling, among other benefits"
 - This reduced cost of capital in financial markets
- *'We've seen a small but positive financial return from the EMR,'*

Investment costs

Investment costs:

- ✓ **Capital and operational IT costs from 2001 through 2004 were around \$35 million.**
- ✓ **\$7.5m in operational expenses for training, and staff time of about 150,000 hours**
- ✓ **Overall costs likely exceeded \$50m altogether.**

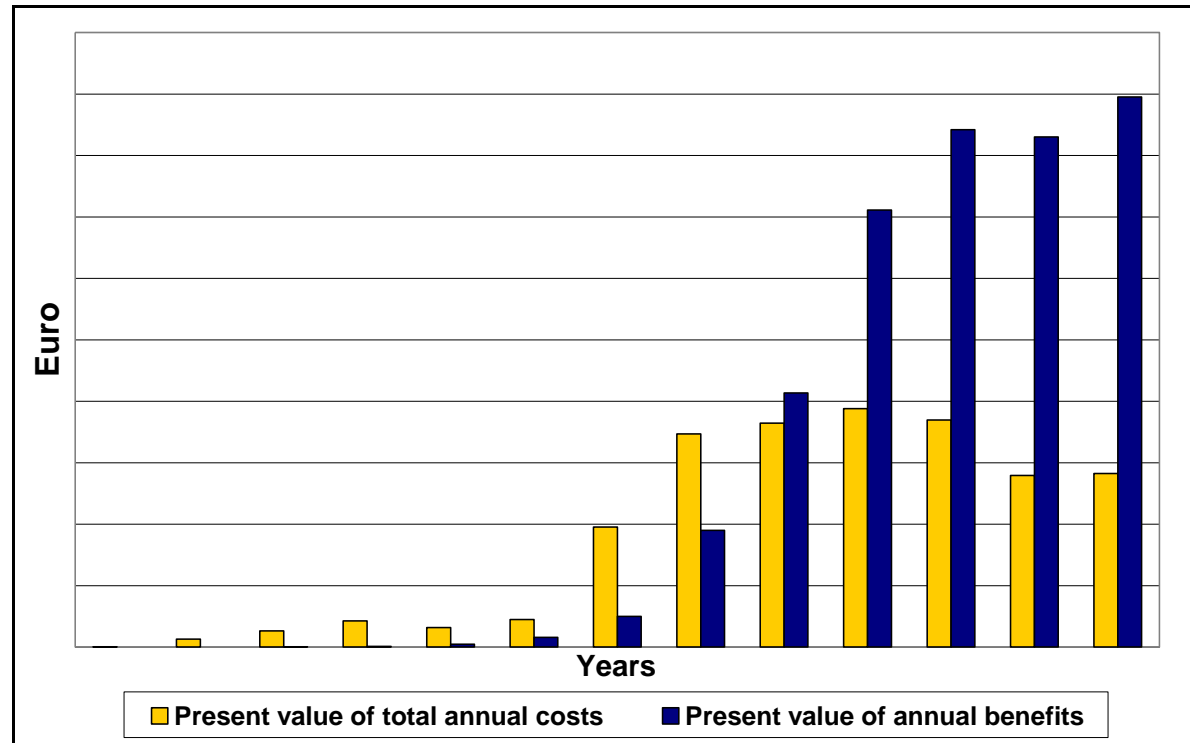
Key success factors

- **Project leadership, governance – sole strategic goal for 3 years**
- **User involvement – ca. 50 working groups to define updated workflows**
- **Training – huge investment in change management (\$ 15m)**
- **Implementation and support – 24 hours for 2 weeks on each ward**

Summary Data

Socio-economic value of impact to society

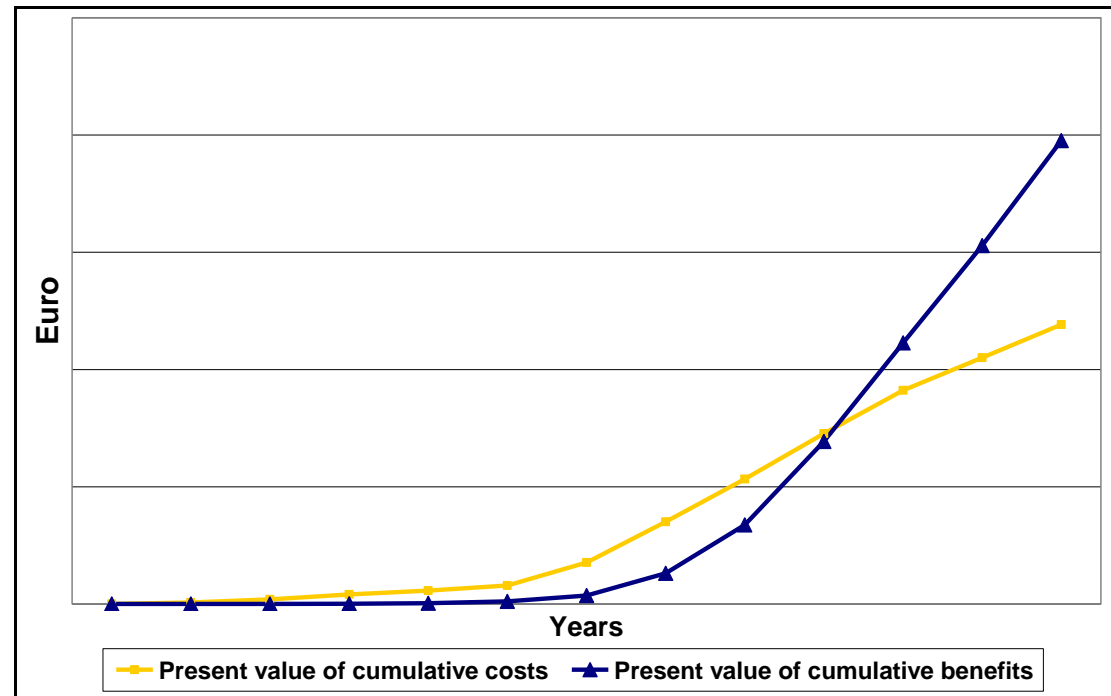
- **Time to positive *annual* socio-economic returns: between 4 and 9, average 7 years**
- **Complex investments in EHR and ePrescribing systems need a long time horizon**



www.ehr-impact.eu

Socio-economic value of impact to society

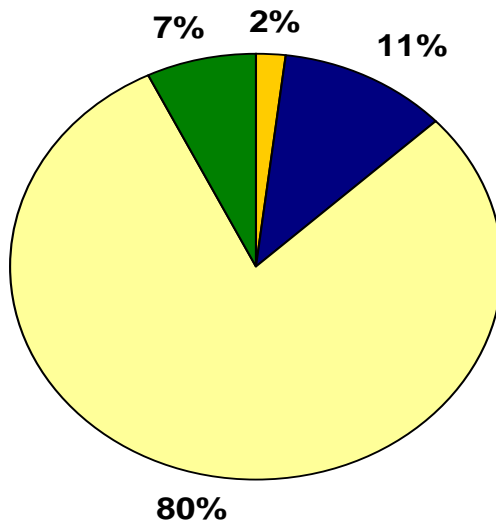
- **Time to positive cumulative socio-economic returns: between 6 and 11, average 9 years**
- **With use increase, the slopes usually change between years 6 and 9**
- **Average socio-economic return (SER) of all cases is about + 80%**
- **Average financial RoI about - 20%**



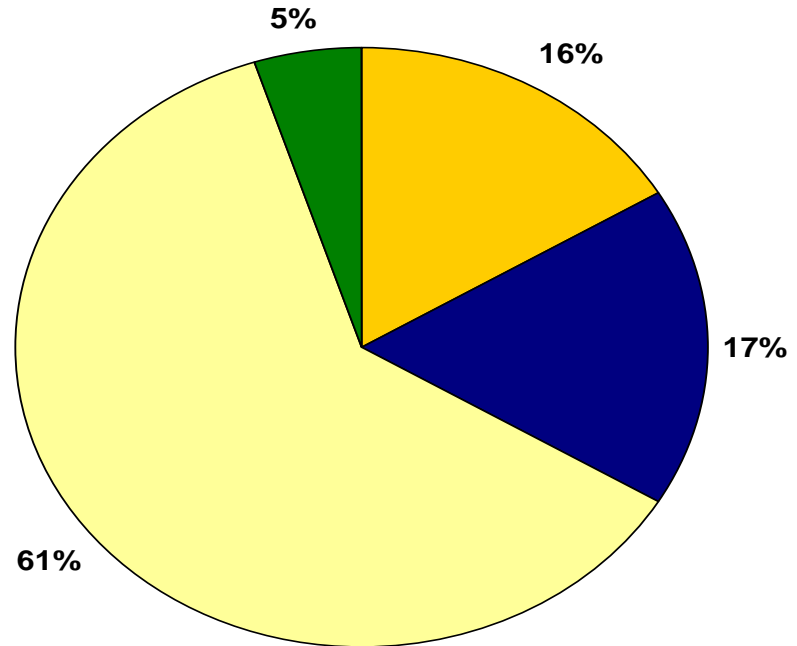
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Distribution by stakeholder groups

Costs



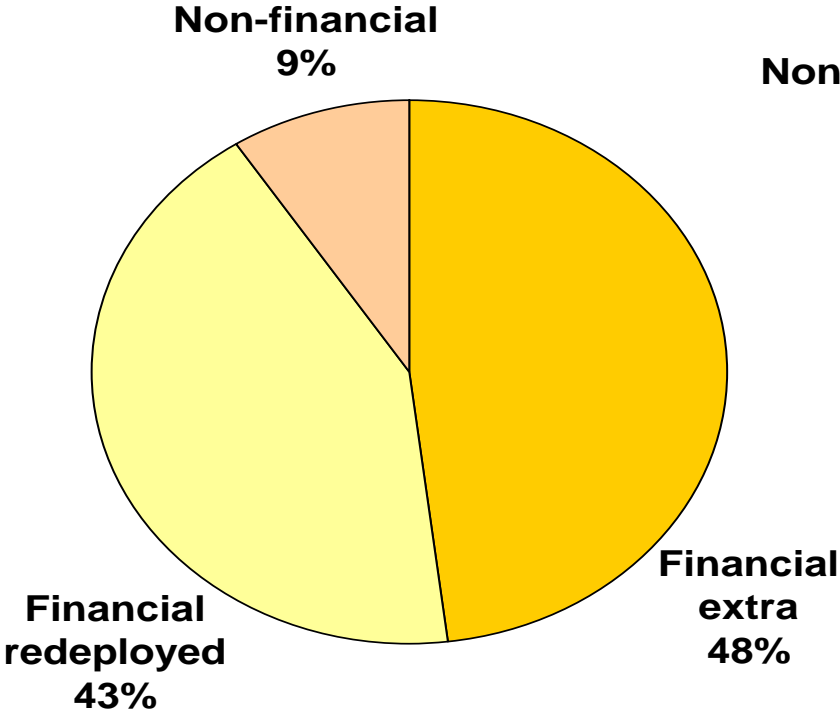
Benefits



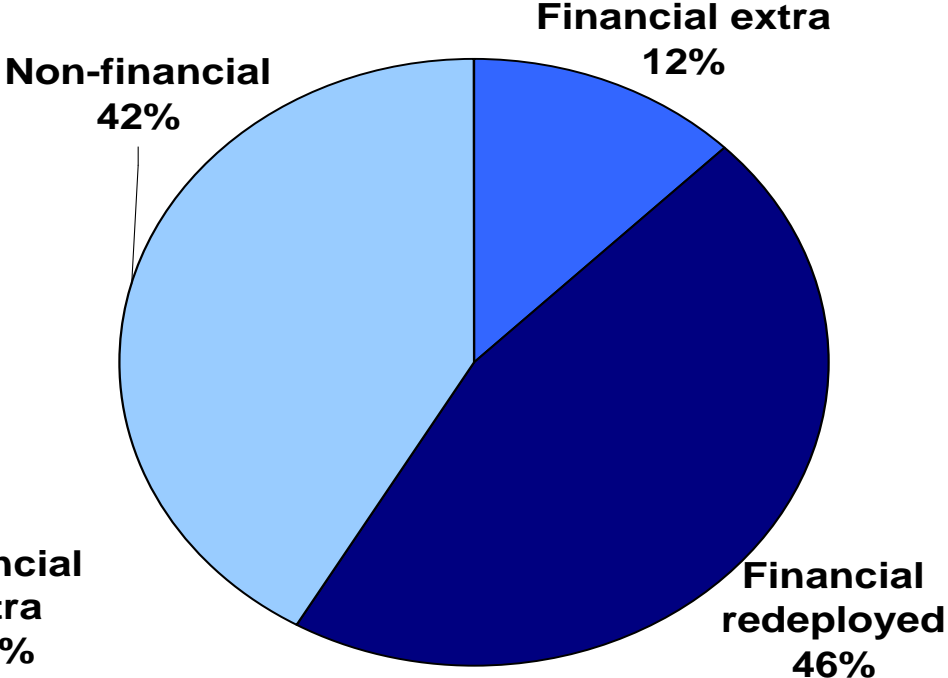
■ Citizens ■ Doctors, nurses, other staff ■ Health provider organisation ■ Third parties

Subsets of benefits & costs

Costs



Benefits



Outlook & success factors

Success factors

- ***Align eHealth developments closely with national and/or regional health policy priorities***
 - streamline healthcare *processes*
 - develop integrated care models ... *It's not an IT project*
- ***Alliances - collaborative model: involve professionals in the design & implementation of ICT systems & applications***
 - create *useful* tools for *clinical practice*
 - provide support to the staff (balance usability vs. regulation)
- **Aim for a sensible *balance* between adding functionalities vs. improving the ICT infrastructure - *take prudent risks***
- **Assure peer to peer *training* and support to professionals**
- **Analyse the information in the system & use *feedback* for improvement**

Success Factors

- Economic **sustainability**
 - Optimise **costs / benefits** relationship **over time**
- Assure sustainable **financing**
- **Business cases** for all stakeholders!
- Management of all financial returns – eHealth generates **little extra cash!**
- Effective **risk management & mitigation**

Final Epigraph

How to find the money for major IT investments in a tight financial climate has a simple answer:

“Tell the chief executive that good IT will help them sleep well at night.”

(University Hospitals Birmingham has developed its own system which, among other benefits, delivers dashboards to managers and clinicians that give some early warning of where departments and wards are running into problems of various kinds.)

Julie Moore, chief executive of University Hospitals Birmingham NHS Foundation Trust

Source: EHI Acute | EHealth Insider, Issue 19, 10 November 2011

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