IRDES

Efficacy and cost assessment of nurse intervention in GP practice for type 2 diabetes patients – A controlled before and after study

An evaluation of a French ambulatory care skill-mix experimentation between General Practitioners and Nurses

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Background (1) : the need for stronger primary care and better quality

- A strong primary care organisation and a high quality of care are seen as two key elements for improving the performance of health care systems

[Docteur2004; Hofmarcher & al 2007; Atun 2004; Macinko & al 2003; Saltman & al 2006]

- Improving quality of care requires implementation of "evidence" in daily practice support by "interactive" policy (e.g. especially for chronic patient: disease management ; performance based economic incentives; group practice and team work)

[Grimshaw & al 2004; Renders & al 2003; Laurent & al 2005; Buchan & al 2005; Zwarenstein & al 2005;Knight & al 2005; Beaulieu & al 2003; Tollen & al 2008;Gravelle & al 2008]

Background (2) : the French institutional context

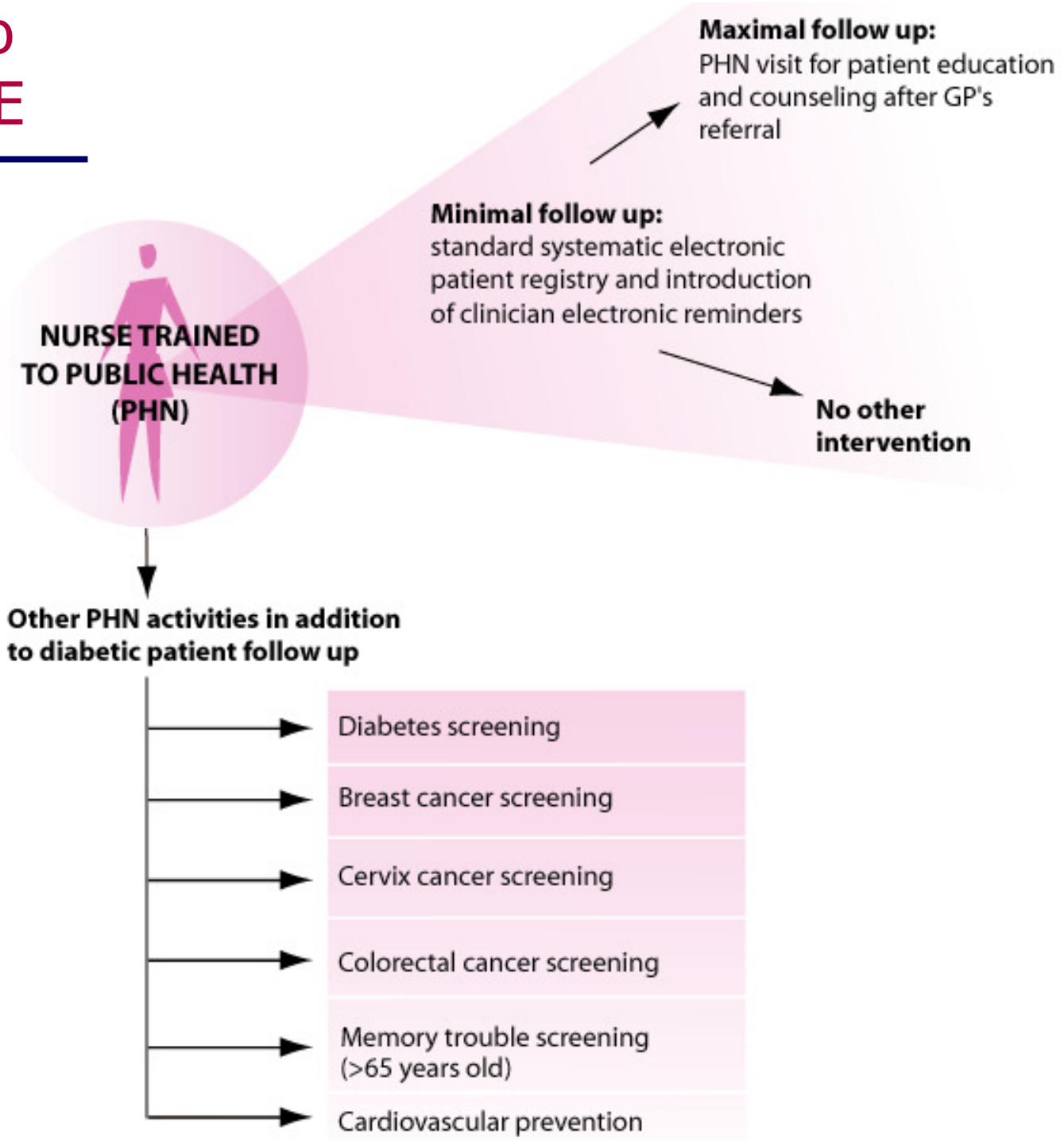
- On the demand side: free access
- On the supply side:
  - A fragmented ambulatory care system, more than a formal primary care organisation
  - With most of ambulatory care professionals working as self-employed, paid on a FFS basis and working in solo practice
  - Several signs of inefficiency in health care delivery

  [HCAAM 2004 & 2007; CNAMTS 1999 & 2002 & 2003]
- Recent initiatives:
  - Since 2005, introduction of a "soft" gate-keeping
  - Experimentation of network (between different type of professionals), GPs group practices and teamwork (e.g. between GPs and nurses) supported by an increasing number of stakeholders (sickness funds, state, local representatives…) and professionals representatives

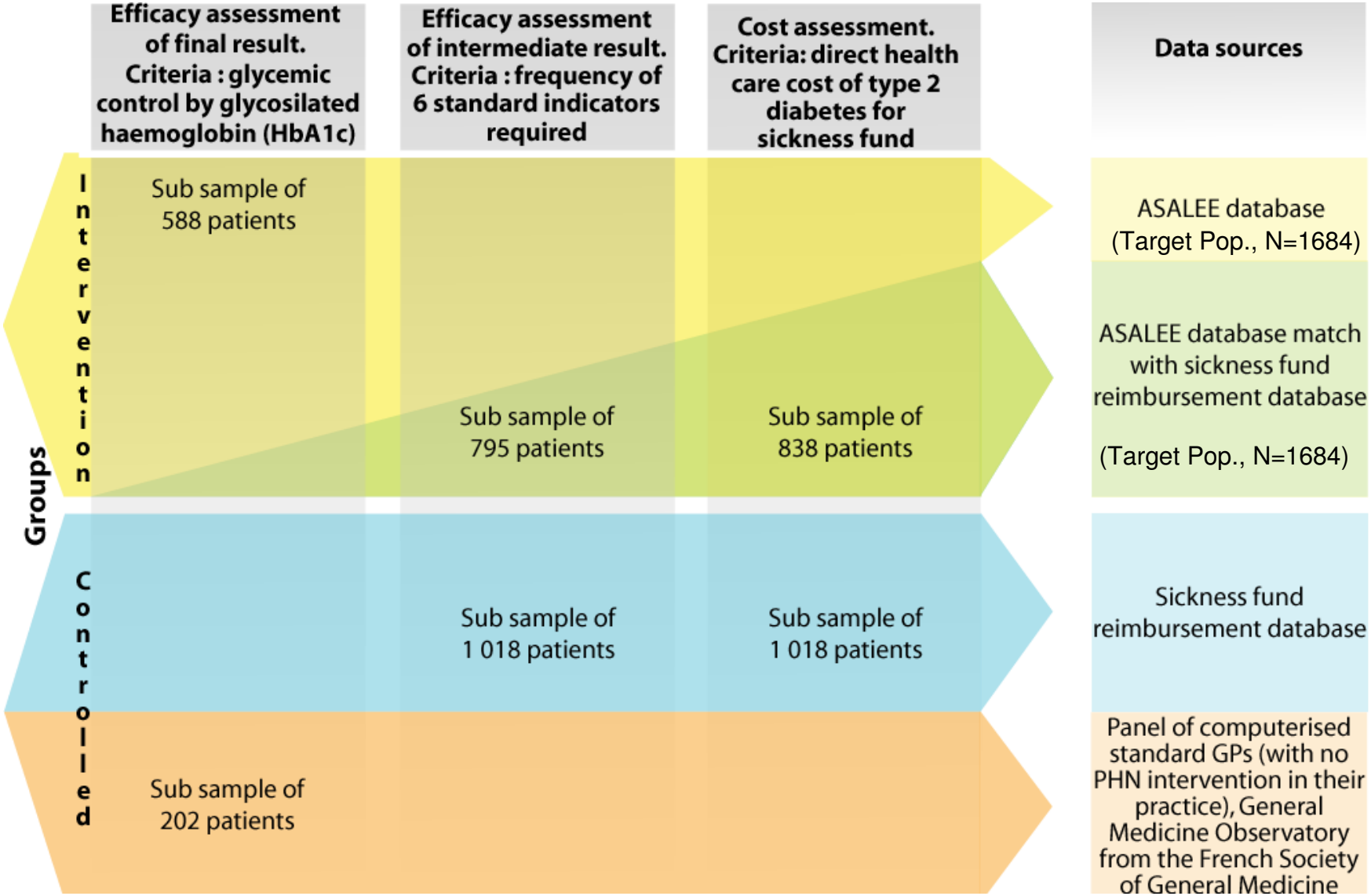
Objective

- To assess effectiveness and efficiency of a French ambulatory care skill-mix (team work) experiment (ASALEE – *Action de Santé Libérale en Equipe*) implement since 2004 by GPs practicing in a local area (Deux-Sèvres area). In 2007: 18 practices, 41 GPs, 8 nurses and 14 653 patients were included.
- Since 2004, ASALEE was included within the national skill-mix experimentation program evaluate by the French National Authority for Health (HAS) with two sub-evaluations:
  - One socio-organizational => ergonomic dept. of Bordeaux Univ.
  - One medico economic => IRDES (diabetes patients).
- To provide some evidence to guide primary care organisation and policy in France

The role given to nurses in ASALEE



Materiel & Method(1): 3 retrospective case studies (intervention vs. control group) for type 2 diabetes patients (T2D) treated by oral anti-diabetic medication



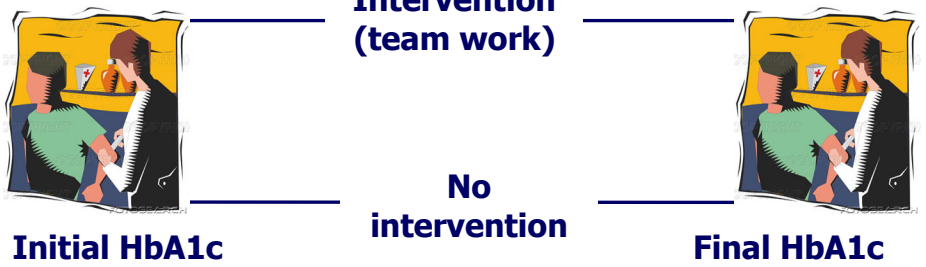
Materiel & Method(2): 3 retrospective case studies (intervention vs. controlled group) for T2D patients treated by oral anti-diabetic medication

Efficacy - final result: control or not of glycaemia (HbA1c)

Intervention group
N=588

Versus

Controlled group
N=202

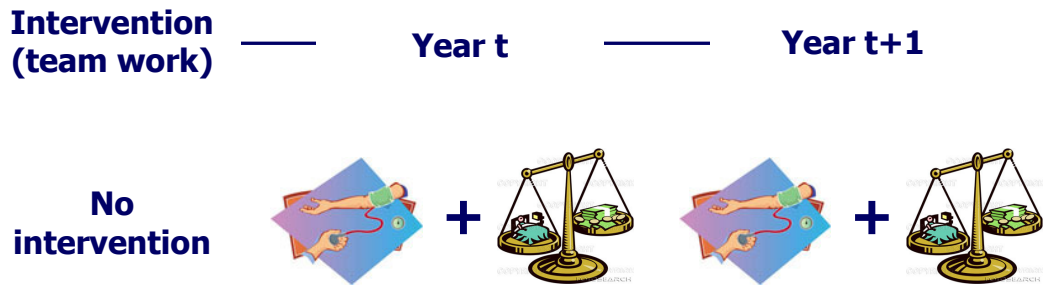


Efficacy - intermediate result:6 proc. ind.
and **Cost** (direct SF cost for all procedures hosp. or ambulatory, total or specific to diabetes)

Intervention group
N=838

Versus

Controlled group
N=1018



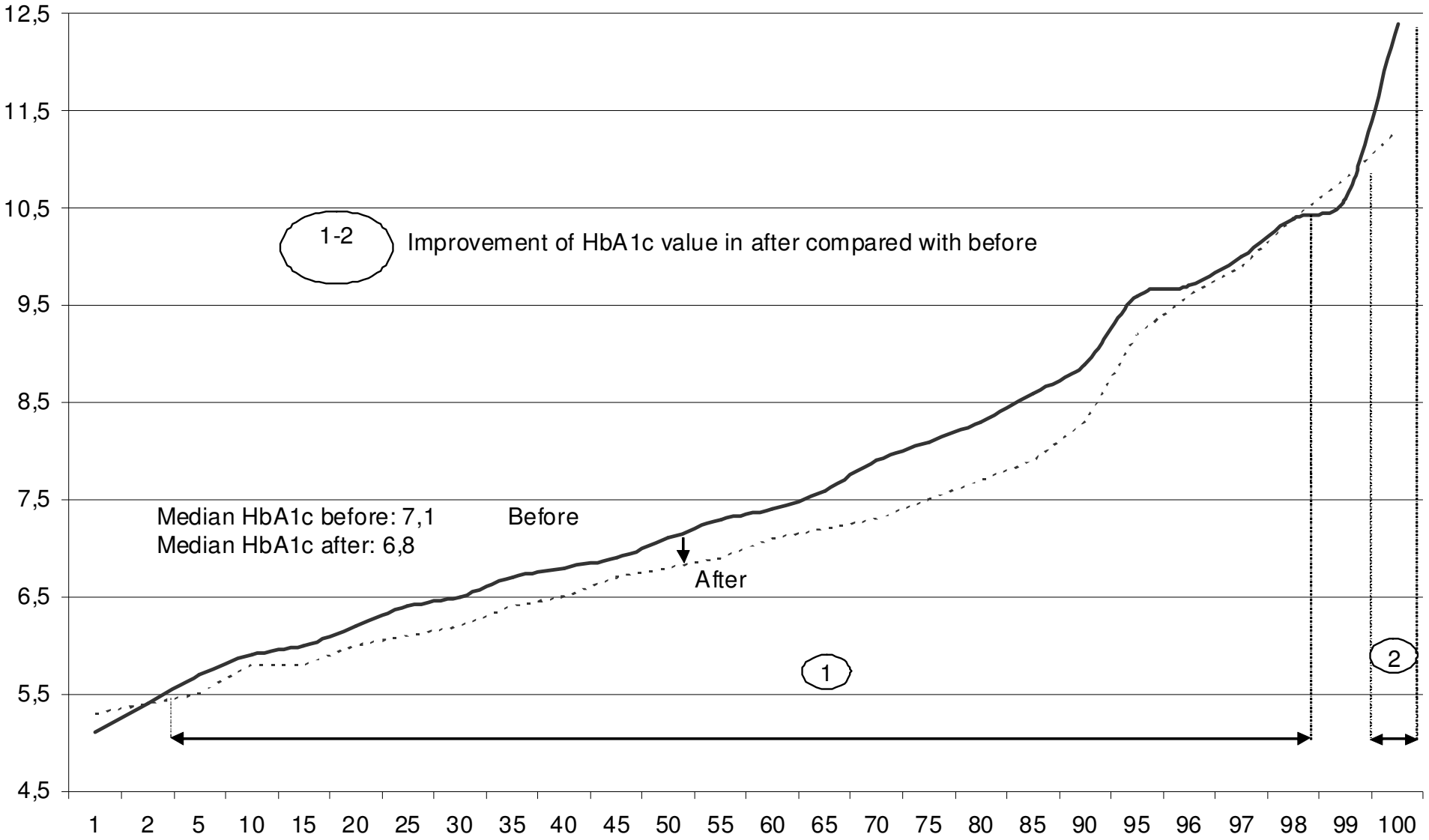
Results(1): after 11 months of follow up a T2D patient in ASALEE has 1.7 more chance that his glycaemia under control (HbA1C<=8%)

	Probability to have an HbA1c					
	maintained or be reduced to <= 6,5%		maintained or be reduced to <= 7%		maintained or be reduced to <= 8%	
N = 790	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq
Control group (OMG)	Ref.		Réf.		Ref.	
Intervention group (ASALEE)	1,335	0,1744	1,199	0,3747	**1,753**	**0,0206**
Controlled by Age, Gender, Hba1c at baseline, number of HbA1c realized, number of months between the initial and final measure of Hba1c, seasonality						
Adjustment						
Deviance	715,87	0,8028	743,15	0,5534	506,06	1
Pearson	3352,98	<.0001	1107,44	<.0001	646,47	0,9971
Wald test	170,80	<.0001	168,79	<.0001	109,94	<.0001
Pseudo R2	0,2974		0,2764		0,2236	
Percent Concordant	85,90		84,80		84,20	
Somers' D	0,72		0,70		0,69	
ROC curve	0,86		0,85		0,84	
gamma	0,72		0,70		0,69	

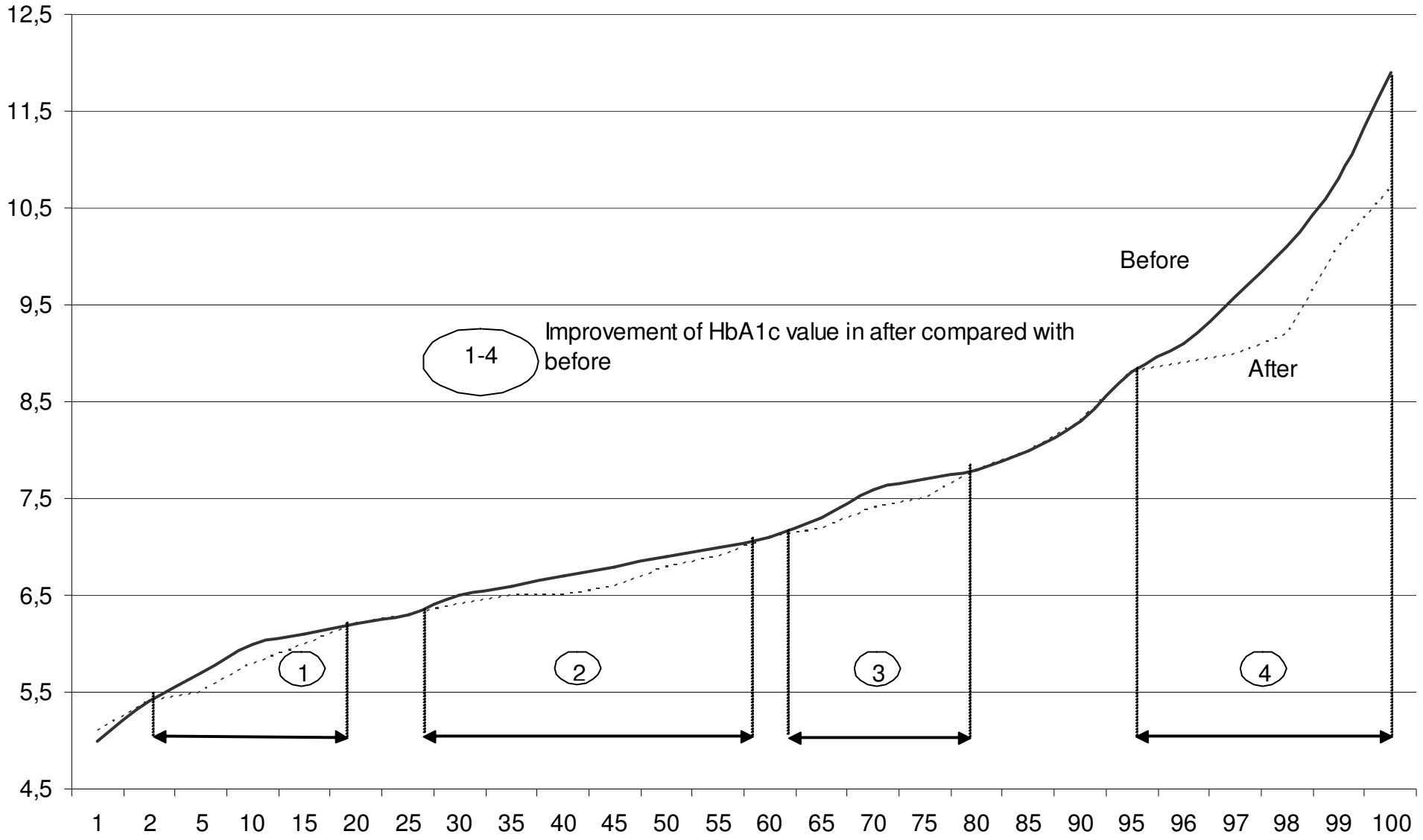
Results(2): ... and the odd ratio increases to 2.6 when a visit for education and counseling was delivered by a nurse

	Probability to have an HbA1c					
	maintained or be reduced to <= 6,5%		maintained or be reduced to <= 7%		maintained or be reduced to <= 8%	
N = 790	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq
Intervention or Control Groups						
Control group (OMG)	*Ref.*		*Réf.*		*Ref.*	
Intervention Group (ASALEE) without PHN VEC	*1,152*	0,5339	*1,022*	0,9223	*1,368*	0,2388
Intervention Group (ASALEE) with PHN VEC	**1,803**	**0,0258**	**1,628**	**0,0572**	**2,673**	**0,0022**
Controlled by Age, Gender, Hba1c at baseline, number of HbA1c realized, number of months between the initial and final measure of Hba1c, seasonality						
Adjustment						
Deviance	720,42	0,826	752,86	0,5357	509,64	1
Pearson	3941,26	<,0001	1185,25	<,0001	677,62	0,9821
Wald test	171,50	<,0001	169,23	<,0001	110,53	<,0001
Pseudo R2	0,3009		0,2803		0,2306	
Percent Concordant	86,00		85,00		84,90	
Somers' D	0,72		0,70		0,70	
ROC curve	0,86		0,85		0,85	
gamma	0,72		0,70		0,70	

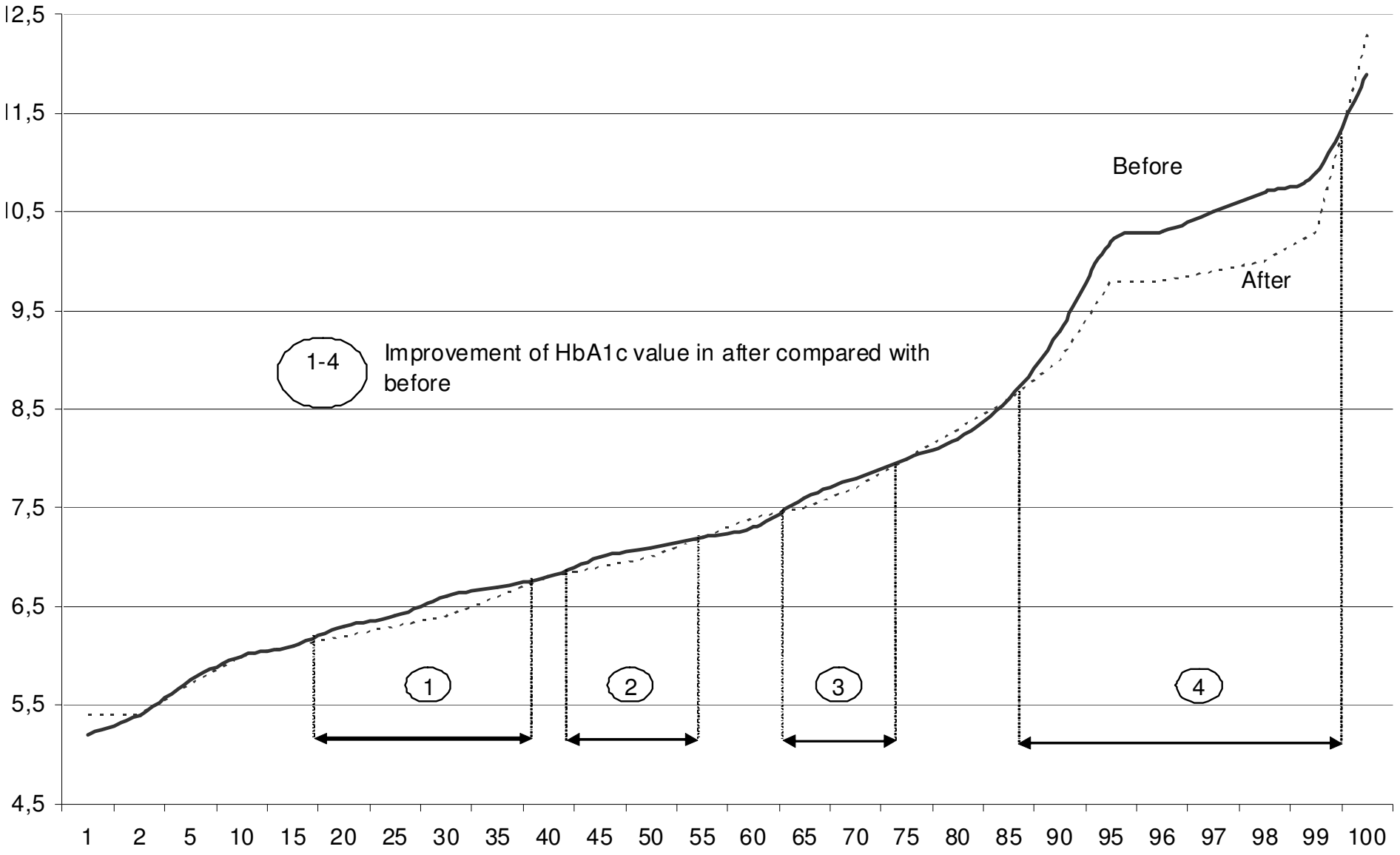
Distribution of the mean value of HbA1c in before and after, regarding percentiles, for diabetic 2 patients in the Intervention group (ASALEE) with at least one PHN visit for education and counseling was performed



Distribution of the mean value of HbA1c in before and after, regarding percentiles, for diabetic 2 patients in the Intervention group (ASALEE) without PHN visit for education and counseling



Distribution of the mean value of HbA1c in before and after, regarding percentiles, for diabetic 2 patients in the control group



Results(3): a T2D patient in ASALEE has 2.1 to 6.8 more chance to become or still be correctly followed up, depending the procedures

	Probability to became or still be correctly followed											
	HbA1c		Micro albuminuria		Funduscopy		Creatinemia		ECG		Lipid checkup	
	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq
Controlled Group (sample of Insured)	*Ref.*		*Ref.*		*Ref.*		*Ref.*		*Ref.*		*Ref.*	
Intervention Group (ASALEE)	**2,12**	**<.0001**	**6,82**	**<.0001**	**1,25**	**0,0462**	**2,53**	**<.0001**	**2,40**	**<.0001**	**2,62**	**<.0001**
Controlled by Age, Gender, Localisation within the department, Type of Mandatory Social Security Scheme, Presence of medicated diabetes complication, Type of medicine treatment												
Adjustment												
Deviance	436,76	<.0001	358,48	0,0228	182,19	0,3588	316,56	0,3414	330,53	0,1703	344,84	0,0675
Pearson	363,55	0,0146	307,76	0,4771	154,34	0,8789	315,36	0,359	289,12	0,7608	301,12	0,5839
Wald test	140,79	<.0001	336,38	<.0001	24,32	0,0068	86,00	<.0001	145,26	<.0001	111,26	<.0001
Pseudo R2	0,0611		0,1563		0,0142		0,0620		0,0682		0,0572	
Percent Concordant	66,30		75,20		56,50		66,90		66,80		65,40	
Somers' D	0,34		0,51		0,15		0,35		0,35		0,32	
ROC curve	0,67		0,76		0,58		0,68		0,67		0,66	
gamma	0,34		0,52		0,16		0,36		0,35		0,32	

Results(4): the odd ratio of the glycemic control process indicator increases to 2.4 when the visit for education and counseling is delivered by nurse

N=1325	Probability to became or still be correctly followed											
	HbA1c		Micro albuminuria		Funduscopy		Creatinemia		ECG		Lipid checkup	
	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq
Controlled Group (sample of Insured)	*Ref.*		*Ref.*		*Ref.*		*Ref.*		*Ref.*		*Ref.*	
(ASALEE) without PHN VEC	1,87	<,0001	6,72	<,0001	1.207	0.1799	2,76	<,0001	2,55	<,0001	2,15	<,0001
(ASALEE) with PHN VEC	2,45	<,0001	6,93	<,0001	1.303	0.0597	2,32	<,0001	2,70	<,0001	2,70	<,0001
Controlled by Age, Gender, Localisation within the department, Type of Mandatory Social Security Scheme, Presence of medicated diabetes complication, Type of medicine treatment for diabetes												
Adjustment												
Deviance	538,03	<,0001	464,40	0,011	270,90	0.0491	389,95	0,5902	431,40	0,113	468,17	0,0079
Pearson	444,41	0,0502	390,11	0,5879	224,44	0.6617	422,81	0,1787	385,04	0,6573	397,08	0,4895
Wald test	143,16	<,0001	336,42	<,0001	24,55	0,0171	86,21	<,0001	111,27	<,0001	147,27	<,0001
Pseudo R2	0,0624		0,1563		0,0143		0,0623		0,0572		0,0693	
Percent Concordant	66,50		75,30		0,16		66,90		65,50		66,90	
Somers' D	0,34		0,51		0,50		0,35		0,32		0,35	
ROC curve	0,67		0,76		0,58		0,68		0,66		0,67	
gamma	0,34		0,52		0,16		0,36		0,32		0,35	

Results(5): these results still be robust even if we look at the Wave4 for which we have a real before and after design

N=1325	Probability to became or still be correctly followed											
	HbA1c		Micro		Funduscopy		Creatinemia		ECG		Lipid checkup	
	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq	Odds ratio	Pr>ChiSq
Controlled Group (sample of Insured)	*Ref.*		*Ref.*		*Ref.*		*Ref.*		*Ref.*		*Ref.*	
Asalee Wave1	1,58	0,0061	6,47	<.0001	1,16	0,4169	3,99	<.0001	1,89	0,0002	2,57	<.0001
Asalee Wave2	3,28	<.0001	10,34	<.0001	1,12	0,6218	3,52	0,0017	2,96	<.0001	2,43	0,0004
Asalee Wave3	3,13	<.0001	5,58	<.0001	1,24	0,3326	1,21	0,4471	2,64	<.0001	1,72	0,0116
Asalee Wave4	**1,89**	**<.0001**	**6,70**	**<.0001**	**1,37**	**0,036**	**2,83**	**<.0001**	**2,44**	**<.0001**	**3,27**	**<.0001**
Controlled by Age, Gender, Localisation within the department, Type of Mandatory Social Security Scheme, Presence of medicated diabetes complication, Type of medicine treatment for diabetes												
Adjustment												
Deviance	655,37	<.0001	611,39	0,0001	365,95	0,0044	406,71	0,9969	581,98	0,0021	512,34	0,2154
Pearson	542,82	0,0432	512,04	0,2182	289,00	0,6349	449,36	0,8943	482,61	0,5603	466,77	0,748
Wald test	149,68	<.0001	338,47	<.0001	25,21	0,0217	92,28	<.0001	148,22	<.0001	115,02	<.0001
Pseudo R2	0,0664		0,1586		0,0147		0,0699		0,0699		0,0601	
Percent Concordant	66,80		75,80		56,60		68,50		67,00		66,20	
Somers' D	0,34		0,52		0,15		0,38		0,35		0,33	
ROC curve	0,67		0,76		0,58		0,69		0,67		0,67	
gamma	0,35		0,53		0,16		0,38		0,35		0,34	

Result(6): ASALEE is relatively efficient compared with the cost of treatment in the control group

	Differentiel cost (Year1-Year0)			
N = 1751	Total expenditure for all procedures	Total expenditure only for diabetes or its risk factors or complications procedures	Ambulatory total expenditure for all procedures	Ambulatory total expenditure only for diabetes or its risk factors or complications procedures
Observed additional cost within ASALEE	60 €	60 €	60 €	60 €
Estimated additional cost threshold for ASALEE	400 €	300 €	70 €	70 €

	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Control group (OMG)	Réf.		Réf.		Réf.		Réf.	
Intervention group (ASALEE)	296,6547	**0,0459**	176,5628	**0,0346**	205,9259	**0,0315**	81,9749	**0,0309**
Controlled by Age, Gender, Localisation within the department, Type of Mandatory Social Security Scheme, Presence of medicated diabetes complication, Type of medicine treatment for diabetes								
Adjustment								
R^2	0,0239		0,0392		0,0393		0,1064	
R^2 adjusted	0,0177		0,0331		0,0332		0,1007	

Conclusion

- This type of organisation (skill mix) appear to be both effective in terms of health outcomes and cost
- The add value of nurses is clearly demonstrate for final outcome (with visit for education and counseling) as for intermediate outcome (electronic patient registry + electronic GP reminder)
- Our results are coherent with the results of existing studies in other countries both in terms of effectiveness [i.e. Grimshaw & al 2006 ; Grimshaw & al 2004; Renders & al 2003; Laurent & al 2005; Buchan & al 2005; Zwarenstein & al 2005] or efficiency [i.e. Knight & al 2005; Beaulieu & al 2003]
- The question remains at least in France to modify the financing model of primary care organisation (FFS for all self-employed professionals in ambulatory care)?

Publication: a French report + working paper in English coming soon (see on irdes website: www.irdes.fr)

Limits of the study

- GPs and nurses participation on a voluntary basis and no random selection (GPs, nurses, patients)
- Two groups of patient were not included in the study (diabetics patients without OAD medication or only with insulin; patients without baseline measure for glycemic control)
- 3 different case studies => no joint analysis of effectiveness and cost
- Others: sample size, observation length, limited scope of individual characteristics, limited scope of patient outcomes measures
- Why ? Because we had to deal with a retrospective evaluation context => an evaluation under constraint

Thank you for your attention and many thanks to…

The members of *ASALEE* association and the health care professionals involve in this experimentation and especially to I. Rambault-Amoros & J. Gautier

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Patient empowerment. European experiences in family practice. Toward a SIG on "patient empowerment and self-management education" in the bosom of WONCA

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Sultan 2 Hall - Saturday 6th September - 15,30 : 17,00