



Swiss Childhood Cancer Registry (SCCR)

u^b

b
**UNIVERSITÄT
BERN**

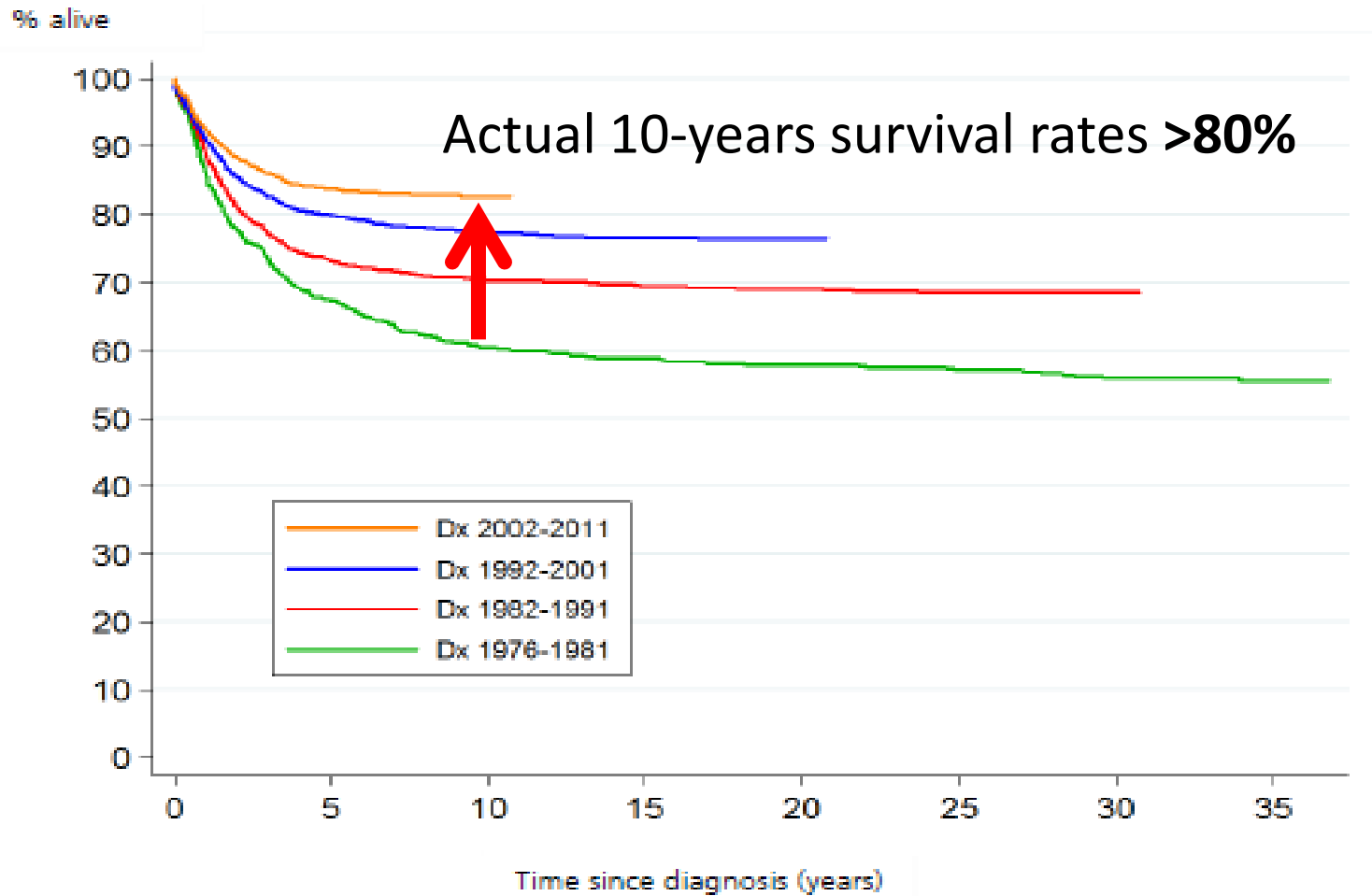
CARDIOVASCULAR PROBLEMS IN SURVIVORS OF CHILDHOOD CANCER AND THEIR SIBLINGS

*Julien Caccia, Corina S. Rueegg, Eva-Maria Hau, Nicolas X. von der Weid,
Gisela Michel, Claudia E. Kuehni*

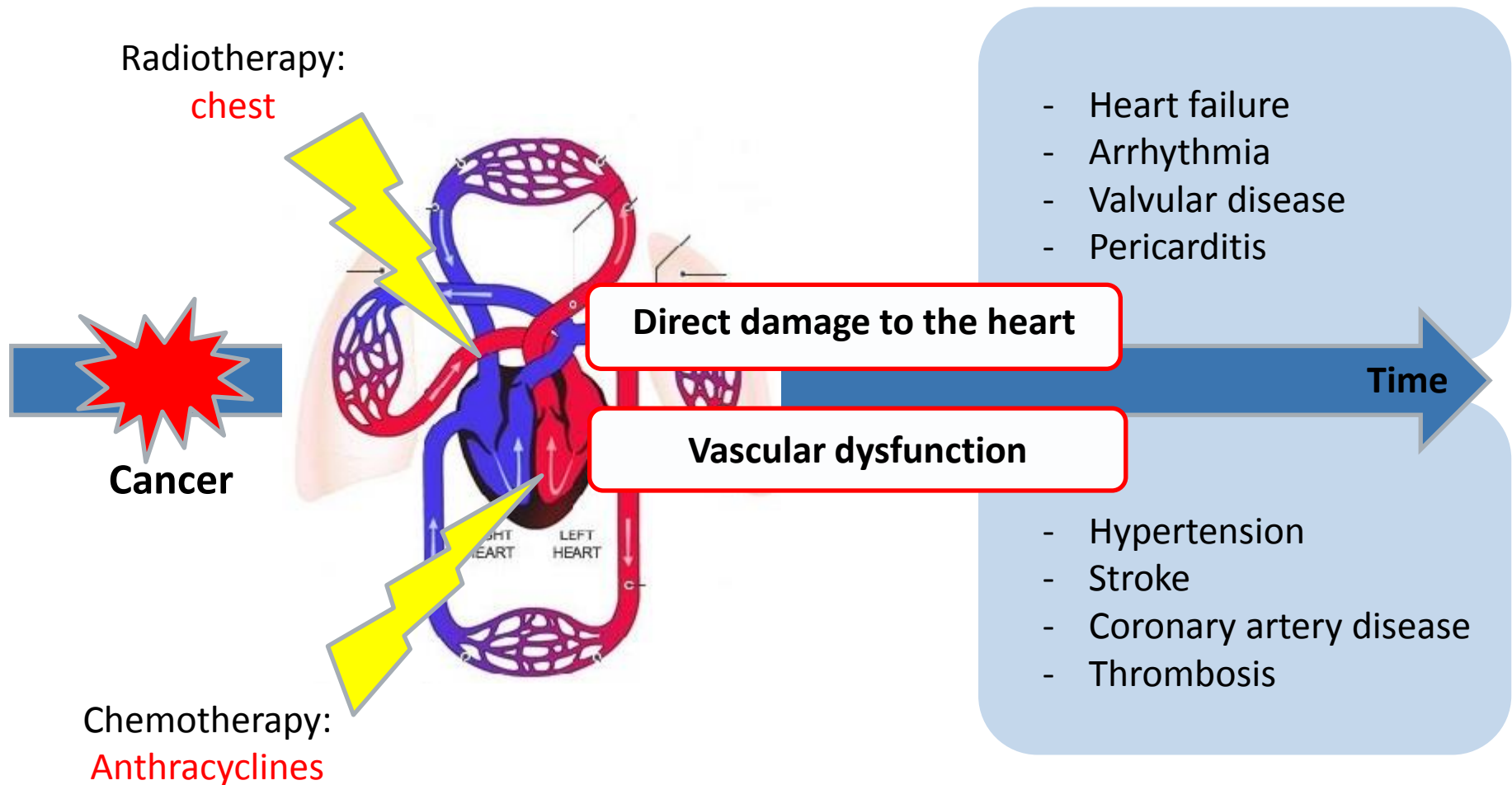
Institute of Social and Preventive Medicine
University of Bern

15 August 2013, Swiss Public Health Conference

Childhood cancer: **burden of disease**



Main mechanisms of cardiovascular damage



Aims

1. **To assess prevalence of cardiovascular disease (CVD)** in childhood cancer survivors compared to their siblings
2. **To identify risk factors for CVD** in childhood cancer survivors



Study design

Swiss Childhood Cancer Registry (SCCR)

Cancer survivors:

- Survived ≥ 5 years
- Diagnosed 1976-2005
- < 15 years at diagnosis
- ≥ 16 years at study

Siblings of the same age range (control group)

Swiss Childhood Cancer Survivor Study (SCCSS)



Questionnaire survey:

- Cancer history (survivors only)
- Quality of life
- Physical and mental health
- Medication and medical care
- Health behaviours
- Socio-economic status

Cardiovascular health?



Outcome and exposures

Outcome:

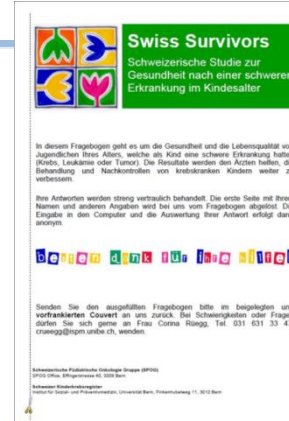
Cardiovascular disease (CVD) , defined as ≥ 1 of the following:

1. Hypertension
2. Arrhythmia
3. Heart failure
4. Myocardial infarction
5. Stroke
6. Deep vein thrombosis/pulmonary embolism (DVT/PE)
7. Valvular problems

Exposures:

From registry: sex, age, age at Dx, year of Dx, cancer, treatments, relapse

From questionnaire: parents' education, smoking, physical activity, BMI



38. Herz und Kreislaufsystem



	Irgendwann im Leben	
	Ja	Nein
Wiederholt gemessener hoher Blutdruck (arterielle Hypertonie)	<input type="checkbox"/>	<input type="checkbox"/>
Herzrhythmusstörungen (Arrhythmien, unregelmässige Herzschläge), welche von einem Kardiologen (Herzspezialisten) abgeklärt werden mussten	<input type="checkbox"/>	<input type="checkbox"/>
Herzinsuffizienz (Herzmuskelschwäche, ev. mit Wassereinlagerungen in Beinen und Lunge und ev. Atemschwäche bei körperlicher Betätigung)	<input type="checkbox"/>	<input type="checkbox"/>
Herzinfarkt	<input type="checkbox"/>	<input type="checkbox"/>
Schlaganfall	<input type="checkbox"/>	<input type="checkbox"/>
Tiefe Venenthrombose oder Lungenembolie	<input type="checkbox"/>	<input type="checkbox"/>
Probleme mit den Herzklappen (Insuffizienz, Verengungen, künstliche Herzklappen etc.)	<input type="checkbox"/>	<input type="checkbox"/>



Study population

Response rate:

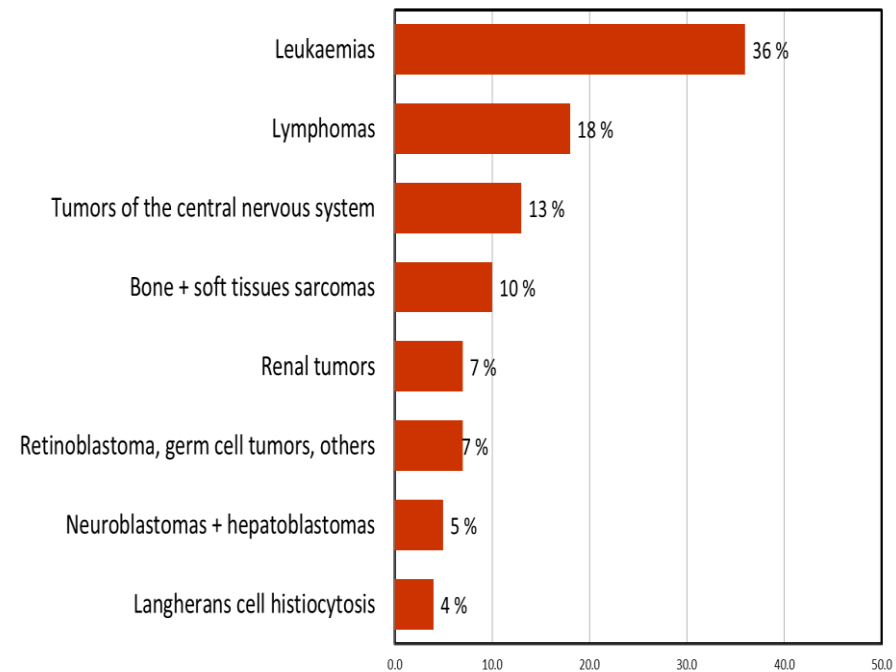
- Survivors: 69%, N= 1'607
- Siblings: 55%, N= 713

Characteristics

- Mean age at diagnosis: 7.6 years
- Mean time since diagnosis: 17 years
- Mean age at survey: 25 years

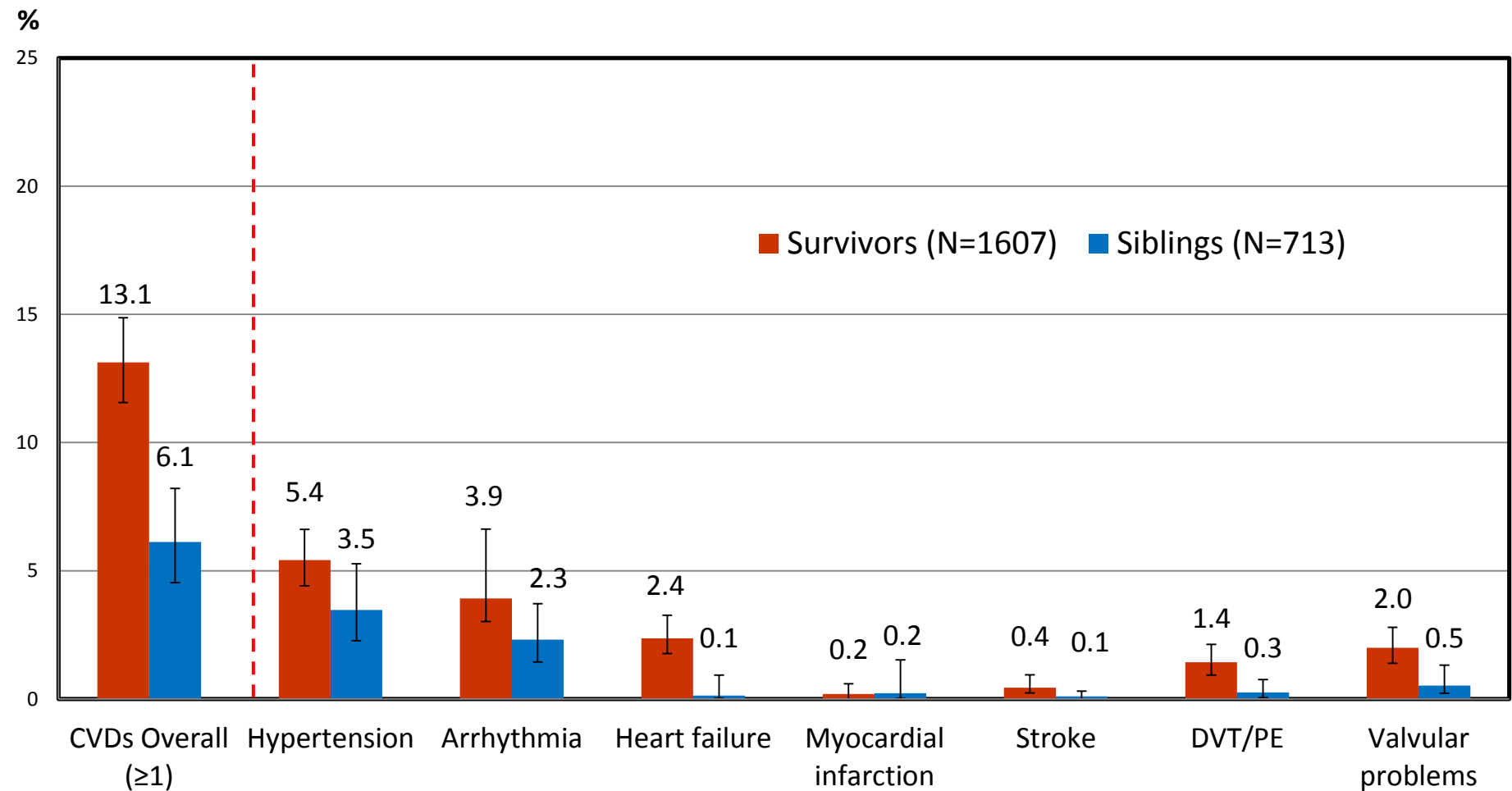
Cancer diagnosis repartition (survivors only)

Adapted from the ICC-3 classification





Prevalence of CVDs in survivors & siblings



Note: age and sex standardized proportion are given for siblings



Risk for CVDs in survivors compared to siblings

		OR ¹	95%CI	global p ²
Survivors vs. siblings	Sibling	1		<0.001
	Survivor	2.32	1.67-3.23	
By Diagnosis	No cancer (siblings)	1		<0.001
	Leukaemia	2.17	1.47-3.19	
	Lymphoma	2.83	1.84-4.34	
	CNS tumor	1.91	1.11-3.33	
	Bone & soft tissue sarcomas	2.10	1.19-3.69	
	Neuroblastoma & hepatic tumor	3.46	1.71-6.98	
	Renal tumor	2.40	1.23-4.66	
	Retinoblastomas & miscellaneous	2.16	1.09-4.28	
	Langherans cell histiocytosis	2.12	0.94-4.79	
By treatment	no treatment (siblings)	1		<0.001
	surgery only	1.61	0.86-2.99	
	Chemotherapy +/- surgery	2.55	1.76-3.69	
	Radiotherapy +/- surgery	2.18	1.03-4.63	
	Chemo+Radio +/- surgery	2.14	1.44-3.18	
	Bone marrow Transplantation	3.42	1.73-6.77	

¹ adjusted for age, sex, BMI, smoking status, parental education



Risk for CVDs in survivors compared to siblings (2)

		OR ¹	95%CI	global p-value ²
BMI	non-obese	1		0.001
	obese	2.23	1.40-3.54	
Age at survey by category	<20	1		<0.001
	20-25	1.22	0.73-1.72	
	25-30	1.92	1.25-2.95	
	30-35	1.79	1.11-2.90	
	35-40	2.95	1.76-4.96	
	>40	4.23	2.40-7.46	

¹ OR from second model (diagnosis), similar in all 3 models, ² global p-values calculated using a likelihood ratio test



Summary

1. **Higher prevalence** of cardiovascular diseases in cancer survivors compared to siblings, even at a **young age**
2. Risk factors: survivors of **Lymphomas** and **neuroblastomas** and those treated with **chemotherapy, radiotherapy and (particularly) bone marrow transplantation**.
3. The absolute risk increases with **age** and **obesity** in survivors and siblings.



Conclusion and discussion

- Prevalence of CVDs after childhood cancer is comparable to international data
- Self-reported data risk to be biased by over reporting (survivors are also more likely to undergo screening procedures)
- Validation self-reported CVDs is on-going (survivors)
- Quantification of the treatments received (i.e. Rx to the chest and anthracyclines) will give more precise estimates
- Finally, we hope, with this analysis, to define groups of survivors who will profit from regular cardiovascular follow-up in Switzerland

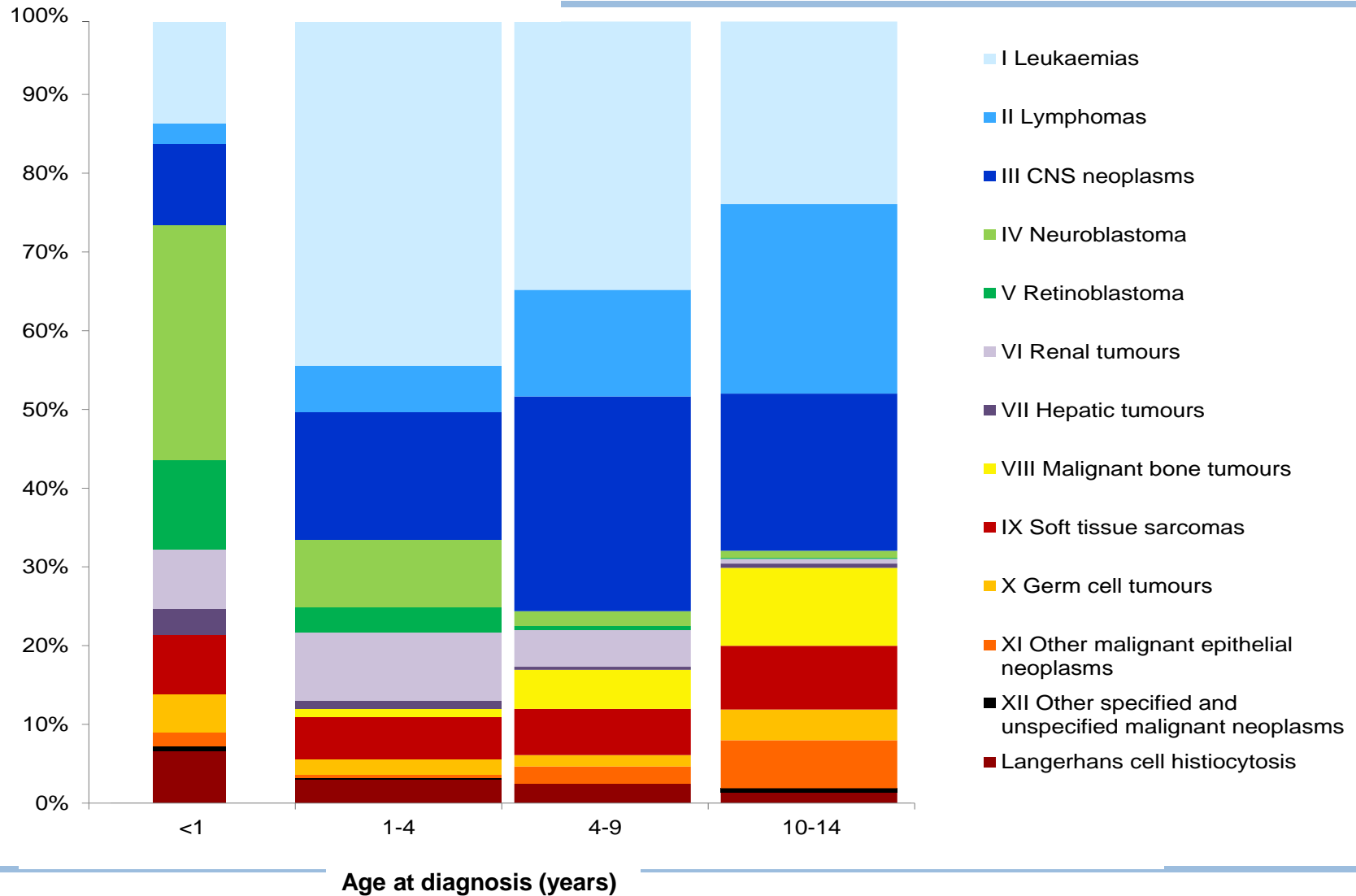
Thank you for your attention!

u^b

b
UNIVERSITÄT
BERN

? / !

Main diagnostic groups SCCR



The Swiss Childhood Cancer Survivor Study investigates late effects

Type of study	Population-based questionnaire survey nested in the SCCR
Time since diagnosis	≥ 5 years
Year of diagnosis	Since 1976
Age at diagnosis	< 21 years (on-going)
Place of diagnosis	Paediatric oncology clinics or other
N (participated)	2,190 survivors



Swiss Survivors
 Schweizerische Studie zur
 Gesundheit nach einer schweren
 Erkrankung im Kindesalter

In diesem Fragebogen geht es um die Gesundheit und die Lebensqualität von Jugendlichen Ihres Alters, welche als Kind eine schwere Erkrankung hatten (Krebs, Leukämie oder Tumor). Die Resultate werden den Ärzten helfen, die Behandlung und Nachkontrollen von krebskranken Kindern weiter zu verbessern.

Ihre Antworten werden streng vertraulich behandelt. Die erste Seite mit Ihrem Namen und anderen Angaben wird bei uns vom Fragebogen abgelöst. Die Eingabe in den Computer und die Auswertung Ihrer Antwort erfolgt dann anonym.

b e t t e r d i n k f ü r i n e r l i e f

Senden Sie den ausgefüllten Fragebogen bitte im beigelegten und **vorfankierten Couvert** an uns zurück. Bei Schwierigkeiten oder Fragen dürfen Sie sich gerne an Frau Corina Rüegg, Tel. 031 631 33 47, crueegg@ispm.unibe.ch, wenden.

Schweizerische Pädiatrische Onkologie Gruppe (SPOG)
 SPOG Office, Effingerstrasse 40, 3008 Bern
 Schweizer Kinderkrebsregister
 Institut für Sozial- und Präventivmedizin, Universität Bern, Finkenhubelweg 11, 3012 Bern

- Adapted for different age groups
- German, French and Italian

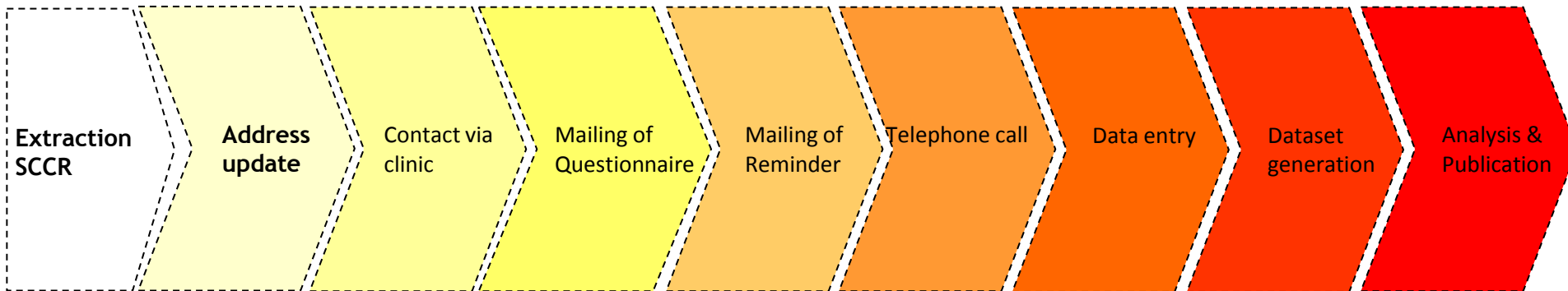
Abbreviations: SCCR, Swiss Childhood Cancer Registry; N, number



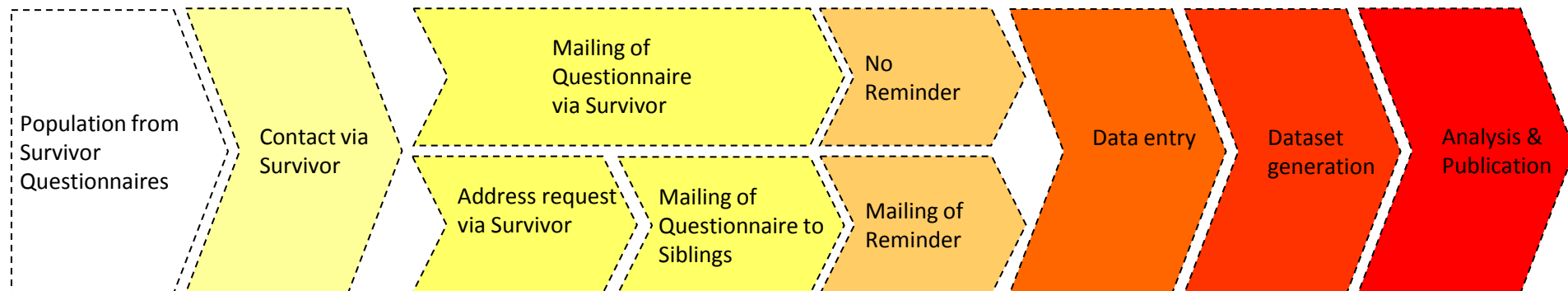
Swiss Childhood Cancer Registry

Study procedure

Survivors



Siblings



SCCSS questionnaire: Cardiovascular chapter

38. Herz und Kreislaufsystem



Irgendwann
im Leben

Ja Nein

Wiederholt gemessener hoher Blutdruck (arterielle Hypertonie)

Herzrhythmusstörungen (Arrhythmien, unregelmässige Herzschläge), welche von einem Kardiologen (Herzspezialisten) abgeklärt werden mussten

Herzinsuffizienz (Herzmuskelschwäche, ev. mit Wassereinlagerungen in Beinen und Lunge und ev. Atemschwäche bei körperlicher Betätigung)

Herzinfarkt

Schlaganfall

Tiefe Venenthrombose oder Lungenembolie

Probleme mit den Herzklappen (Insuffizienz, Verengungen, künstliche Herzklappen etc.)

Comparison of self-reported cardiovascular problems between childhood cancer survivors and their siblings

SCCSS question	Survivors (n=1'607)		siblings ¹ (n=713)		OR	95% CI	p-value
	N	%	N	%			
Hypertension							
no	1'520	94.59	688	96.53			
yes	87	5.41	25	3.47	1.59	[0.98-2.58]	0.058
Arrythmia							
no	1'544	96.08	697	97.69			
yes	63	3.92	16	2.31	1.72	[0.99-2.97]	0.05
Heart failure or cardiomyopathy							
no	1'569	97.64	712	99.87			
yes	38	2.36	1	0.13	18.34	[2.5-134.11]	0.004
Myocardial infarction							
no	1'604	99.8	711	99.78			
yes	3	0.19	2	0.22	0.894	[0.08-8.27]	0.894
Stroke							
no	1'600	99.56	712.3	99.9			
yes	7	0.44	0.7	0.1	4.44	[0.78-25.17]	0.093
Venous thrombosis /pulmonary embolism							
no	1'584	98.57	711	99.75			
yes	23	1.43	2	0.25	5.81	[1.72-19.68]	<0.001
Valvular problems							
no	1'575	98.01	709	99.48			
yes	32	1.99	4	0.52	3.91	[1.47-10.43]	0.006
≥1 CVD							
no	1396	86.9	669	93.88			
yes	211	13.1	44	6.12	2.31	[1.63-3.28]	<0.001