Universität Basel

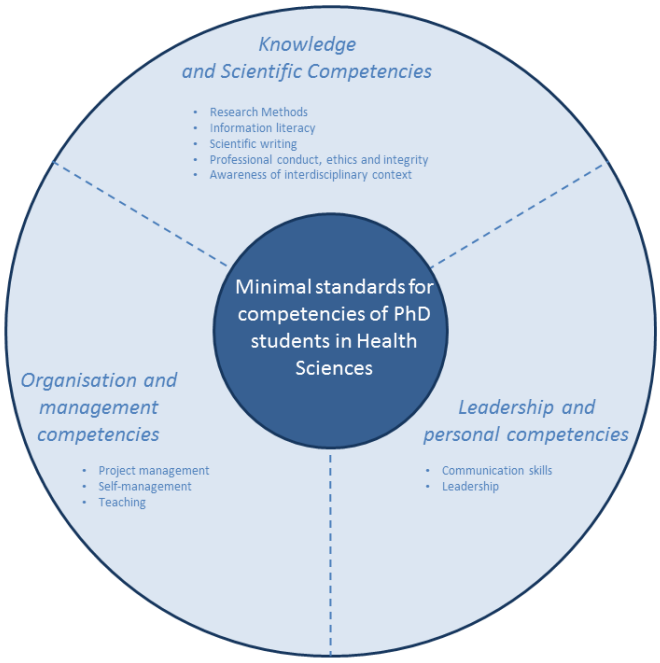
Departement
Public Health

Minimal Standards for Competences of PhD Students in Health Sciences

There are three domains that PhD students need to acquire competences in during their training (see Figure):
A Knowledge & Scientific Competences
B Organization & Management Competences
C Leadership & Personal Competences

The following table lists several components for each of the three domains with a short content description using keywords and referring to a **competence level**. These levels are defined in the following way:
Knowledge (K) implies to have a basic understanding of theories, concepts, processes and facts.
Knowledge & skills (KS) means to have the basic understanding and to be able to apply it.
Knowledge & skills & attitude (KSA) means to have the basic understanding, to be able to apply it, and to represent the concepts in everyday professional life.

Figure



A) <u>Knowledge & Scientific Competences</u>

Competences	Description	Level
Research Methods	**1) Posing the research question**	**KS**
	-Population, Intervention, Comparison, Outcome, Study design (PICOS)-structure	**K**
	-Levels : genome, cell, person, health service/profession, community , health care system; translational research (laboratory to controlled clinical setting (TR1) and from there to routine clinical practice (TR2))	**K**

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	2) Study design	**KS**
	-Study types: *experimental (e.g. RCT); intervention design) ; non-experimental (cross-sectional, cohort, case-control, ecological); systematic review and meta-analysis; health economic studies*	**K**
	-Sampling methods	**K**
	-Variables: *bias; confounding; interaction*	**K**
	-Intervention development: *drug, device, diagnostic test, behaviour, programme*	**K**
	-Other aspects: *quantitative & qualitative research (= mixed methods); causation*	**K**
	3) Data collection methods & data management	**KS**
	-Use of routine data; questionnaires; interviews; focus groups; online vs paper data collection forms (CRFs)	**K**
	-Measurement (reliability, validity, scales & scores, diagnostic accuracy, health metrics)	**K**
	-Data quality assurance; monitoring	**K**
	4) Data analyses	**KS**
	-Use of a statistical analysis program (e.g. STATA, R, SAS)	**KS**
	-Descriptive & inferential statistics (effect measures, random error, multivariable regression modelling, multilevel modelling, dealing with missing data)	**K**
	-Analysis of narrative (qualitative) data	**K**
Information literacy	- **Electronic databases** (e.g. MEDLINE, EMBASE, Cochrane library) - Search strategies - Management of references (software)	**KS**
	- **Critical appraisal**; selection of relevant information	**KS**
Scientific writing	- Study protocol (detailed methods, SOPs, CRFs) - Grant proposal (selecting a «selling strategy») - Manuscript for publication (reporting guidelines, e.g. CONSORT, PRISMA, STROBE)	**KS** (for all)
Professional conduct, ethics & integrity	- Consideration of autonomy & safety of study participants; informed consent procedures; vulnerable populations - Seeking approval from ethics committees - Responsibilities towards stakeholders, scientific community, and society (publication, authorship, plagiarism, scientific misconduct)	**KSA** (for all)

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Awareness of interdisciplinary context	- Philosophy of science - Awareness of international research trends in Health Sciences	**K** (for all)

B) Organisation & Management Competences

Competences	**Description**	**Level**
Project management	- Planning and structuring of research - Organization of infrastructure and logistics - Quality assurance	**KS** (for all)
Self-management	- Career planning (inside/outside of academia) - Systematic building of knowledge-base and professional network - Personal qualities: enthusiasm, self-confidence and self-reflection - Work-life balance, time management	**KSA** (for all)
Teaching	- Knowledge transfer - Teaching methods/didactics - Supervision of bachelor/master students	**KSA** (for all)

C) Leadership & Personal Competences

Competences	**Description**	**Level**
Communication skills	- Communication with team/assistants, peers, supervisor, stakeholders, students - Presentations to scientific and public audiences - Team- & network building (collaboration, internationalisation) - Conflict- & change-management - Development of professional approach to errors made and lessons learned	**KSA** (for all)
Leadership	- Development and formulation of own ideas - Ability of risk-taking - Taking responsibilities - Delegating tasks in a research group	**KSA** (for all)