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**General and Geriatric Pharmacology Education in the Netherlands: a Curriculum Mapping**

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**Introduction**

In recent decades pharmacology and pharmacotherapy education has become fully integrated in the medical curriculum. This has resulted in the loss of specific knowledge on pharmacology and –therapeutics. The decline of specialized pharmacotherapy knowledge in medical students could result in prescribing errors and harm, especially in vulnerable older patients. To …..

**Methods**

At all Dutch Medical Schools a structured interview on both quantity and quality of general and geriatric pharmacology and –therapy education was performed with coordinating teachers. A list of core learning goals was developed.(Table 1)

**Results**

All eight Medical Schools participated. Contact hours range from 39-107h, ECTS (European Credit Transfer System; 1ECTS=28h) ranged from 0-3. At mean 78% of all learning goals were covered by the curriculum: 85% on knowledge, ( 69% on skills (and 59% on attitudes (Within knowledge and skills geriatric items scored comparable (getal noemen) to general items, 60% of geriatric pharmacotherapy skills were covered(100% of geriatric pharmacology knowledge and skills education was covered in case a geriatrician was one of the coordinators . 4/8 medical schools lacked an appropriate assessment procedure of knowledge and skills. Evaluation was mostly based on students’ opinions only. The teachers rated their own students as mediocre prepared for daily practice.

**Conclusion**

Within the Netherlands large differences are seen on quantity and quality of general and geriatric pharmacology and –therapy education. Education on (geriatric) pharmacotherapy skills and attitudes should be improved, e.g. by improving geriatricians involvement in the education. Next, assessment procedures should receive additional attention.

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| Category | Knowledge/skills/attitudes | Learning goals (n=47) |
| Basic pharmacology | Knowledge: basic | Introduction to pharmacology and therapyPharmacodynamics\* Pharmacokinetics\* Intra-individual variance and pharmacogenetics |
| Clinical pharmacology | Knowledge: application | Adherence, compliance and concordanceTherapeutic Drug monitoring\*Adverse Drug reactions\*Drug interactionsMedication errorsDrug Development and regulationMedicines ManagementEvidence Based PrescribingEthical and legal aspects of prescribingPrescribing for patients with special requirements (expect older patients)Rational prescribing\*Clinical toxicologyMisuse of drugsComplementary and alternative medicineUse of antibiotics and antibiotic resistance |
| Geriatric pharmacology | Knowledge | Altered physiology in old peopleAltered pharmacokinetics in old people Altered pharmacodynamics in old peopleDifferent response in frequent used drugs in old peoplePrinciples that underlie prescribing in old peoplePolypharmacyFinding relevant information on drug and dose adjustments |
| Pharmacotherapy | Skills | Medication history takingPrescribe a new medicineCalculate drug dosesPrescription writingCommunicationReviewing prescriptionsAdverse drug reactions Obtaining information to support rational prescribingPrescribing high risk medicinesDrug administrationClinical pharmacokineticsPrescribing drugs to relieve pain and distressDrug therapy vs non-drug therapy |
| Geriatric pharmacotherapy | Skills | Basic elements of geriatric pharmacotherapyAvoid potentially harmfull drugs Monitoring medication in old peopleInterpret physical, laboratory, and diagnostic test results in accordance with age related changes |
| Medication related attitudes | Attitude | Risk-benefit analysis recognitionRecognizing personal limitations in knowledgeRecognition of balanced approach to the introduction of new drugsA new prescription as an experiment |

*Table 1. List of core learning goals*