

## Urological-Geriatric Integrated Diagnostic-Therapeutic Pathway for elderly patients with urologic diseases

Lisa Cammalleri,<sup>1</sup> Romina Custureri,<sup>1</sup> Monica Pomata,<sup>1</sup> Fabio Bonini,<sup>2</sup> Giacomo Capponi,<sup>2</sup> Carlo Introini,<sup>2</sup> Alberto Pilotto<sup>1,3</sup>

<sup>1</sup>Geriatric Unit, Department of Geriatric Care, Orthogeriatric and Rehabilitation, Frailty Area, Galliera Hospital, Genova; <sup>2</sup>Urology Unit, Galliera Hospital, Genova; <sup>3</sup>Interdisciplinary Department of Geriatrics, University of Bari, Italy

### Abstract

Aging of population represents a new challenge for physicians who have to deal with the balance of risk and benefit in a population that is poorly represented in clinical trials. Frail patients need individualized treatments because of their high risk of developing complications in the course of therapies. Several studies have reported the effect of frailty on falls, hospitalization and mortality, but only few have focused on surgical patients and frailty is not included in the traditional surgical risk scales.

Geriatric surgery patients have a physiologic vulnerability requiring assessment beyond the traditional preoperative evaluation of adults. Although single organ evaluation cannot be ignored in elderly population, recognition of frail patients during preoperative assessment may provide additional insight in predicting poor outcome; thus, aiding preoperative decision-making.

We developed a Urological-Geriatric Integrated Diagnostic-Therapeutic Pathway in order to evaluate  $\geq 65$  years old patients affected by urogenital pathologies which require major surgery and to early identify frail subject.

### Introduction

Several studies have reported the effect of frailty on falls, hospitalization and mortality, but only few have focused on surgical patients and frailty is not included in the traditional surgical risk scales.<sup>1</sup>

Recognition of frail patients during preoperative assessment may provide additional insight in predicting poor outcome; thus, aiding preoperative decision-making.<sup>2</sup>

The most common definition of frailty

is an age-associated, biological syndrome characterized by decreased biological reserves, due to dysregulation of several physiological systems, which puts an individual at risk when facing minor stressors, and is associated with poor outcomes, *i.e.* disability, hospitalization and death.<sup>3</sup> The prevalence of frailty in people older than 65 years is high, ranging from 7 to 16.3%.<sup>4</sup>

The prevalence increases with age, and is greater in women than in men, reaching 30% of people aged 85 years.<sup>5</sup> Frail patients have a higher risk of adverse outcomes including prolonged hospitalization, mortality, nursing home admission and fall and a lower probability of receiving appropriate medical and interventional procedures.<sup>6</sup> Moreover, when they are subjected to invasive methods, they show a higher risk of complications. So, the recognition of frailty has become a high priority issue in medicine in order to evaluate more carefully the risk/benefit ratio.

Literature shows a better improvement of clinical outcomes of elderly people undergoing surgery when they undergo an evaluation of frailty with multidimensional assessment.<sup>7</sup>

In recent years, some surgical fields have paid particular attention to the assessment of frailty by implementing an integration with geriatrics for the evaluation and treatment of older patients, with a particular regard for the frail ones.<sup>8</sup> In some specific surgical areas this integration has taken on particular emphasis (orthogeriatric model, cardiac surgery, maxillo-facial surgery). Nevertheless, an integrated uro-geriatric approach is currently not yet properly established. The majority of urologic procedures are performed in patients ages 65 and older, 20% of whom are considered to be frail.<sup>7,9</sup>

Aim of our study was to identify patients with a moderate/severe geriatric risk in order to create an appropriate clinical pathway, using the following tools: i) definition of a clinical and functional prognosis, before and after urological surgery, by using the multidimensional prognostic index (MPI); ii) interventions in order to modify the present clinical risk conditions before and after surgery; iii) early start of an appropriate social-assistant path for older patients undergoing urological surgery.

### Materials and Methods

At the Galliera Hospital in Genoa we have developed a Urological-Geriatric Integrated Diagnostic-Therapeutic Pathway (PDTA). This PDTA involves the establishment of a team made up of specialist uro-

Correspondence: Lisa Cammalleri, Geriatric Unit, Department of Geriatric Care, Orthogeriatric and Rehabilitation, Frailty Area, Galliera Hospital, Genova, Italy. E-mail: lisa.cammalleri@galliera.it

Key words: Elderly; urologic surgery; multidimensional prognostic index; frailty; decision making

Received for publication: 19 August 2019. Accepted for publication: 1 October 2019.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

©Copyright: the Author(s), 2019  
Licensee PAGEPress, Italy  
Geriatric Care 2019; 5:8501  
doi:10.4081/gc.2019.8501

gists and geriatricians who perform an integrated geriatric and urological evaluation of subjects aged  $\geq 65$  years affected by urogenital pathologies which require major surgery, *i.e.* laparoscopic and open surgical: radical cystectomy, radical nephrectomy, radical prostatectomy.

A first assessment before surgery is performed at the medical clinic where each patient performs the SELFY\_MPI, which is a validated self-assessment questionnaire of the multi-dimensional risk for negative outcomes.<sup>10</sup> In case of SELFY\_MPI class of risk 2 (moderate risk) or 3 (high risk), the patient is addressed to the uro-geriatric ambulatory, which includes an interdisciplinary team, *i.e.* urologist, geriatrician, anesthesiologist, nurse, social worker.

The geriatrician will evaluate the patients for clinical history, functional assessment, multidimensional evaluation and calculation of MPI.

The MPI was developed as a prognostic tool for hospitalized older patients.<sup>11,12</sup> MPI is derived from eight Comprehensive Geriatric Assessment components: basal and instrumental activities of daily living (ADLs, IADLs), cognitive status, nutritional status, risk of developing pressure sores, co-morbidity, polypharmacy, *i.e.* the number of drugs taken by the subject, and living status.<sup>11</sup> Problems for each component are classified as major (1 point), minor (0.5 points) or none (0 points). Scores are then summed and divided by eight, with scores  $\geq 0.66$  graded as frailty. Compared with other frailty measurements, MPI shows a higher predictive ability of adverse outcomes and is strongly associated with adverse outcomes in hospitalized older patients<sup>13</sup> and also in general practice patients.<sup>14</sup>

According to the Urological-Geriatric PDTA (Figure 1), when the MPI score identifies a subject in a class of risk 2 or 3, a specific assessment of the areas at risk is required, in order to improve the altered clinical and/or functional parameter, plan appropriately surgery, follow patient after surgery during hospitalization, plan uro-

logic and geriatric follow-up after one month and if necessary, after 3 and/or 6 months.

The urologist provides correct indications for the surgical intervention, assesses the risks, shares with the geriatrician the personalized counselling activities and defines all the aspects of the surgical ses-

sion. The anesthetist provides the authorization for the intervention. The nurse plans the required visits and the social worker, involved on indication of the geriatrician, activates the territorial assistance services.

The following outcomes will be evaluated at short (48 h after surgery) and long-

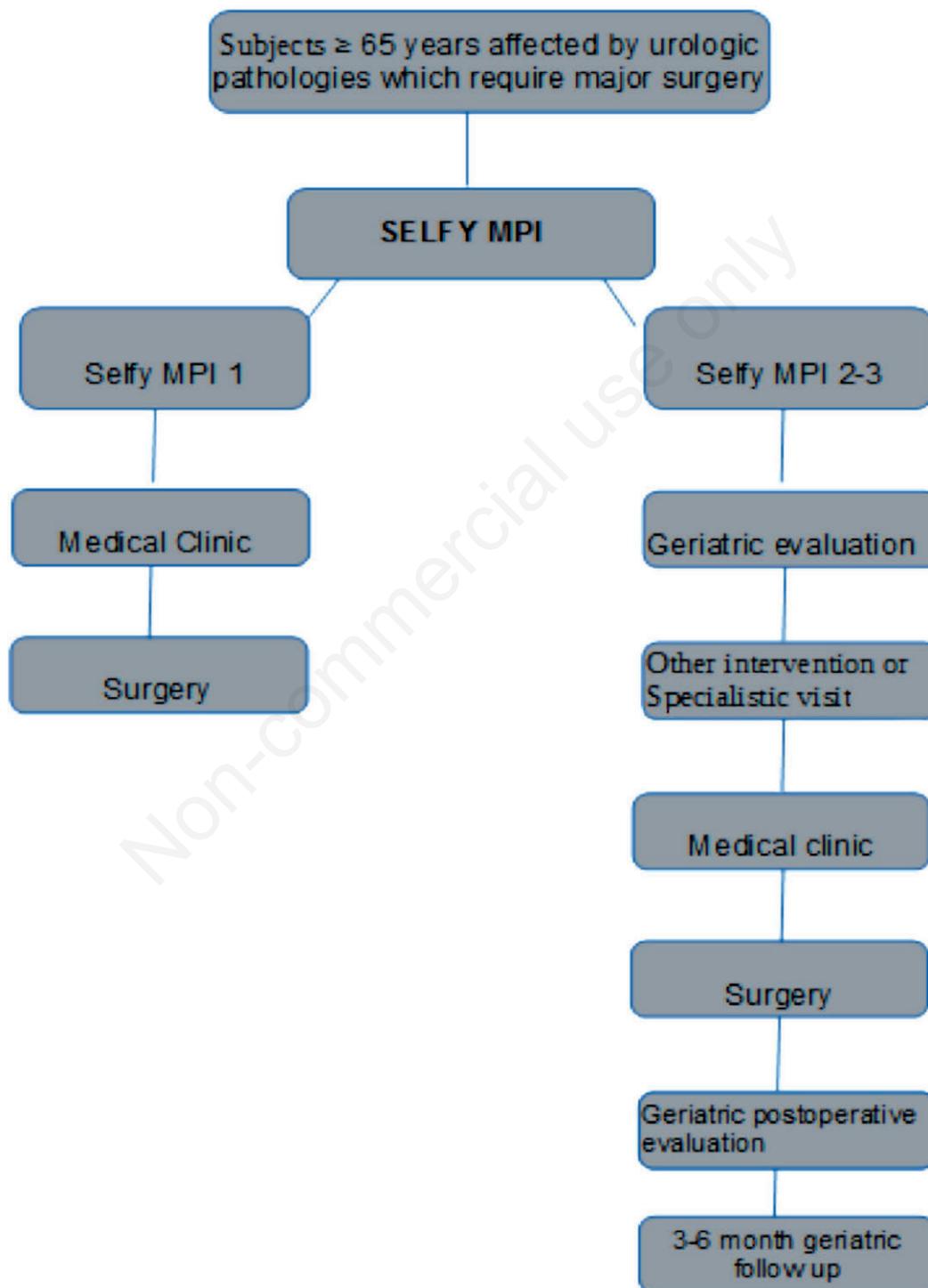


Figure 1. Flow-chart of the Urologic-Geriatric Integrated Diagnostic-Therapeutic Pathway. MPI, multidimensional prognostic index.

term (3-6 months after surgery) (Figure 1).

Short-term (within 48 h from the intervention) outcomes include peri- and post-operative complications, such as paralytic or mechanical ileus, acute renal failure, anemia; local complications, such as abdominal hernia, stoma ischemia and/or necrosis, sepsis (secondary to respiratory, urinary, central venous catheter or other infections), delirium and death.

Long-term outcomes (up to 3 and 6 months after the intervention) take into account the length of hospital stay, the number of specialist consultations required, the number of re-admissions in hospital within 30 days of discharge and the long-term mortality.

Table 1 shows the planned discharged in different settings based on MPI scores.

## Results

This urologic-geriatric PDTA has started on 01 February 2019 and until 31 July 2019 it has included 35 patients aged from 66 to 92 years old (mean age=74 years), 31 males and 3 females.

After urological diagnosis and indication to surgery, the patients were admitted to the medical clinic where they performed the SELFY MPI. 33 patients showed a SELFY MPI class of risk 1 so they underwent to laparoscopic or open surgery without entering in the geriatric protocol: 13 patients underwent a radical laparoscopic prostatectomy, 10 a radical cystectomy (8 open surgery 2 laparoscopic surgery), 7 patients a radical nephrectomy (4 laparoscopic surgery, 3 open surgery), 2 a partial nephrectomy (1 laparoscopic surgery, 1 open surgery) and 1 patient underwent to a radical laparoscopic nephrectomy and contralateral partial nephrectomy.

Two patients resulted at the SELFY-MPI into the class of risk 2, so they were evaluated by geriatricians that performed the full MPI, whose results confirmed moderate risk class (MPI 2). After the evaluation of ASA class (American Society of Anesthesiologists

physical status classification) the two patients were included into the IV grade of risk (patients with severe systemic disease that is constant threat to life);<sup>15</sup> therefore, the anesthetist excluded surgery.

## Discussion

For a person of advanced age, surgery is an extremely stressful situation. At the same time, this is a patient group that varies greatly in terms of its available resources and its risk factors. It is essential that this variability be taken into account in order to obtain the best possible individualization of treatment.

Frailty is a geriatric syndrome that reflects a state of decreased physiological reserve and increased vulnerability to stress. So, it can be considered a measure of susceptibility to poor health outcomes in response to stressors.

A recent review article included 23 studies investigating the relationship between frailty and postoperative outcome. A significant association was shown between frailty and increased 30-day, 90-day, and 1-year mortality, the occurrence of postoperative complications; and increased duration of hospital stay.<sup>16</sup> Another review of 44 studies investigating postoperative outcome after surgery clearly showed the role of frailty.<sup>17</sup> Frailty was associated with an increased incidence of postoperative complications. No association was found between the complications and the classical prognostic factors such as age or the American Society of Anesthesiologists (ASA) classification.<sup>17</sup>

There has been a recent swell of early research regarding frailty in urologic oncology and its related perioperative effects. Frailty has been well documented to be independently associated with poor urologic postoperative outcomes including higher rates of complications, prolonged length of hospital stays and higher rates of discharge to skilled or assisted nursing facilities.<sup>7,9</sup>

Up of 75% of patients over the age of

85 are not frail, although frailty tend to increase with age. Frailty assessment may predict outcomes in older neoplastic patients, with the result that its influence on survival is comparable to the TNM stage.<sup>18</sup>

An observational trial performed an analysis of frailty focusing exclusively on urological patients.<sup>19</sup> This trial enrolled 78 older patients undergoing major urological surgery (endoscopic or open surgery) and showed a significant association between frailty and the risk of major complications, after both urological surgery and endoscopy. Recently a retrospective study reported the experience of a pre-operative risk assessment in a population of 31 elderly patients treated for urologic cancer. This evaluation led to propose a modification of an element of care for 66% of patients and to propose therapeutic abstention for only 3 patients. An evaluation whose purpose is to adapt to the physiological age of patients and their overall state of health, surgical treatment and postoperative management is feasible and seems to help unmask elements of fragility usually not detected.<sup>20</sup> Fried frailty criteria were demonstrated to be predictive of high-grade complications after radical cystectomy, while individual components were predictive of having any complication.<sup>21</sup> Moreover frailty also has significant economic consequences as demonstrated in one study of 235 patients undergoing heart surgery.<sup>21</sup>

In our PDTA we used the MPI score to identify patients at risk of negative outcomes. MPI is a widely validated prognostic tool, based on a standard CGA. Three large systematic reviews reported that MPI was a CGA-based prognostic tool with good discrimination, accuracy and calibration,<sup>22</sup> useful both in clinical practice and research<sup>12</sup> and showing highest validity, reliability and feasibility compared to other tools used to identify frail older patients.<sup>23</sup> Indeed, multi-center studies demonstrated that the MPI was a significantly more accurate predictor of all-cause mortality than other frailty indices<sup>24</sup> as well as an independent predictor of length of hospital stay<sup>25</sup> with high sensitivity to clinical changes during hospitalization.<sup>26</sup> Thus, the European Medicines Agency (EMA) in 2018 reported that *the MPI is able to extract information from CGA to categorize frailty in three subgroups with excellent prognostic value.*<sup>27</sup>

The creation of an integrated urologic-geriatric PDTA provides a better personalization of the clinical/diagnostic pathway and prognostic classification of the patients. This could determinate a greater integration of the therapeutic proposal using a tailored care plan addressed to the multi-dimension-

**Table 1. Planned discharged in different settings based on multidimensional prognostic index scores.**

	Ordinary discharge	Protected hospital discharge	Follow-up 1-3-6 months
MPI 1	X	-	-
MPI 2	X	X	-
MPI 3	-	X	X

MPI, multidimensional prognostic index.

al clinical and functional needs of the elderly also after hospital discharge. Patients identified as more frail during the pre-surgery phase (SELFY\_ MPI 2-3 and MPI 2-3) are *treated* with the purpose of improving their functional status through physical exercises, nutritional supplementation, anxiety management strategies, treatment of anemia where necessary, evaluation of cognitive status for the risk of development of delirium, *etc.* The prevalence of in cardiac, vascular, pulmonary, as well as metabolic and cerebral diseases is higher in old age.<sup>28</sup> During preoperative evaluation it is necessary to identify these disorders, which can be further investigated by means of additional diagnostic methods. Polypharmacy is associated with a poor postoperative outcome. Non-essential drugs should be discontinued during the perioperative phase and medication analysis is necessary for suspension of potentially inappropriate medication.<sup>29</sup>

## Conclusions

Age by itself should not be considered a factor precluding surgical treatment. The correct approach for the management of the surgical patients, in this case the urological patients, consists on an early identification and construction of a multidisciplinary pathway in the pre-operative, peri-operative and post-operative settings of older people stratified by a frailty score. This is the only possible way to reduce mortality, morbidity and costs for the treatment of urological diseases in elderly patients.

Frailty is strongly associated with discharge to skilled or assisted living facilities among patients undergoing most types of inpatient urologic surgery of varying complexity.

Moreover, it was also strongly associated with short-term postoperative complications among patients undergoing most urological procedures. These findings highlight the importance of preoperative frailty assessment and how this assessment can enhance surgical decision-making among physicians, patients and their families for optimized postoperative outcomes

The results we have obtained so far are still preliminary. On the basis of these first data, however, the possibility of extend the PDTA to patients with require endoscopic surgery will be evaluated.

By now this multidisciplinary model has been applied only to urologic surgery. On the basis of our preliminary results, we will evaluate to extend this approach also to other surgical or medical fields.

## References

1. Robinson TN, Eiseman B, Wallace JI, et al. Redefining geriatric preoperative assessment using frailty, disability and co-morbidity. *Ann Surg* 2009;250:449-55.
2. Dasgupta M, Rolfson DB, Stolee P, et al. Frailty is associated with postoperative complications in older adults with medical problems. *Arch Gerontol Geriatr* 2009;48:78-83.
3. Clegg A, Young J, Iliff S, et al. Frailty in elderly people. *Lancet* 2013;381:752-62.
4. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: evidence for a phenotype of frailty. *J Gerontol A Biol Sci Med Sci* 2001;56:M146-56.
5. Veronese N, Siri G, Cella A, et al. Older women are frailer, but less often die than men: a prospective study of older hospitalized people. *Maturitas* 2019;128:81-6.
6. Singh M, Stewart R, White H. Importance of frailty in patients with cardiovascular disease. *Eur Heart J* 2014;35:1726-31.
7. Makary MA, Segev DL, Pronovost PJ, et al. Frailty as a predictor of surgical outcomes in older patients. *J Am Coll Surg* 2010;210:901-8.
8. Greco A, Greco M, D'Onofrio G, et al. La chirurgia nel grande anziano: rischi e opportunità. *Quaderni - Ital J Med* 2017;5(2):35-9.
9. Suskind AM, Walter LC, Boscardin JSMR, Finlayson E. Impact of frailty on complications in patients undergoing common urological procedures: a study from the American College of Surgeons National Surgical Quality Improvement database. *BJU Int* 2016;117:836-42.
10. Pilotto A, Veronese N, Quispe Guerrero KL, et al. Development and validation of a self-administered multidimensional prognostic index to predict negative health outcomes in community-dwelling persons. *Rejuvenation Res* 2018 [Epub ahead of print].
11. Pilotto A, Ferrucci L, Franceschi M, et al. Development and validation of a multidimensional prognostic index for one-year mortality from comprehensive geriatric assessment in hospitalized older patients. *Rejuvenation Res* 2008;11:151-61.
12. Dent E, Kowal P, Hoogendijk EO. Frailty measurement in research and clinical practice: A review. *Eur J Intern Med* 2016;31:3-10.
13. Pilotto A, Veronese N, Daragjati J, et al. on behalf of the MPI AGE Investigators. Using the Multidimensional Prognostic Index to Predict Clinical Outcomes of Hospitalized Older Persons: a Prospective, Multicentre, International Study. *J Gerontol A Biol Sci Med Sci* 2018. [Epub ahead of print].
14. Meyer AM, Siri G, Becker I, et al. The Multidimensional Prognostic Index in General Practice: one-year follow-up study. *Int J Clin Pract* 2019:e13403. [Epub ahead of print].
15. Doyle DJ, Garmon EH. American Society of Anesthesiologists Classification (ASA Class). *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2019 Jan-.2019 May 13.
16. Lin HS, Watts JN, Peel NM, et al. Frailty and post-operative outcomes in older surgical patients: a systematic review. *BMC Geriatrics* 2016;16:157.
17. Watt J, Tricco AC, Talbot-Hamon C, et al. Identifying older adults at risk of harm following elective surgery: a systematic review and metaanalysis. *BMC Med* 2018;16:2.
18. Ommundsen N, Wyller TB, Nesbakken A, et al. Frailty is an independent predictor of survival in older patients with colorectal cancer. *Oncologist* 2014;19:1268-75.
19. Moro FD, Morlacco A, Motterle G, et al. Frailty and elderly in urology: Is there an impact on post-operative complications? *Cent European J Urol* 2017;70:197-205.
20. Prin-Touvron L, Huillard O, Xylinas E, et al. [Multidisciplinary and systematic preoperative-assessment in geriatric urologic oncology surgery: Feasibility and results]. *Prog Urol* 2019;29:318-32 [Article in French].
21. Burg ML, Clifford TG, Bazargani ST, et al. Frailty as a predictor of complications after radical cystectomy: A prospective study of various preoperative assessments. *Urol Oncol* 2019;37:40-7.
22. Yourman LC, Lee SJ, Schonberg MA, et al. Prognostic indices for older adults: A systematic review. *JAMA* 2012;307:182-92.
23. Warnier RM, van Rossum E, van Velthuisen E, et al. Validity, reliability and feasibility of tools to identify frail older patients in inpatient hospital care: a systematic review. *J Nutr Health Aging* 2016;20:218-30.
24. Pilotto A, Rengo F, Marchionni N, et al. Comparing the prognostic accuracy for all-cause mortality of frailty instruments: A multicentre 1-year follow-up in hospitalized older patients. *PLoS One* 20127:e29090.
25. Volpato S, Bazzano S, Fontana A, et al. Multidimensional Prognostic Index predicts mortality and length of stay during

- hospitalization in the older patients: A multicenter prospective study. *J Gerontol A Biol Sci Med Sci* 2015;70:325-31.
26. Volpato S, Daragjati J, Simonato M, et al. Change in the Multidimensional Prognostic Index Score during hospitalization in older patients. *Rejuvenation Res* 2016;19:244-51.
27. Committee for Medicinal Products for Human Use (CHMP) (2018). Reflection paper on physical frailty: instruments for baseline characterization of older populations in clinical trials. EMA/CHMP/778709/2015.
28. Goldfarb M, Bendayan M, Rudski LG, et al. Cost of cardiac surgery in frail compared with nonfrail older adults. *Can J Cardiol* 2017;33:1020-6.
29. Olotu C, Weimann A, Bahrs C, et al. The Perioperative Care of Older Patients. *Dtsch Arztebl Int* 2019;116:63-9.

Non-commercial use only