

UNDERSTANDING PHYSICIANS' ATTITUDES TOWARDS HORMONE THERAPY

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Objective: We sought to understand the relationship among components of residency education about hormone therapy (HT), knowledge about HT, and provider attitudes toward HT during a time of rapidly changing practice guidelines.

Methods: We surveyed residents in the University of Pittsburgh Internal Medicine residency programs between February to April 2002 (after the release of the Heart Estrogen/Progestin Replacement Study and prior to the release of preliminary Women's Health Initiative data) regarding demographics, educational (didactic and experiential) exposures to HT and menopause management, knowledge about HT, and attitudes toward HT.

Results: Sixty-nine of 92 (75%) eligible residents completed the survey; 38% were women. The race and gender of responders did not differ from nonresponders. Residents had significant didactic exposure to HT and menopause management with 80% reporting more than one didactic exposure. Despite this, HT knowledge was low (mean knowledge score $47 \pm 16\%$) and only 26% of residents felt prepared to counsel patients about HT. We identified four factors related to provider attitudes toward HT: "persistence" in universally recommending HT, confidence in "HT benefits," concern about "HT cardiac risks," and concern about "HT noncardiac risks." More appropriate attitudes were associated with attending a lecture, having a rotation with a discussion of menopause management (i.e., Women's Health), and a continuity practice including more than 30% women. Pharmaceutical detailing and self-directed study were associated with less appropriate attitudes. Knowledge did not influence attitudes. Strongly held beliefs about the benefits of HT, appropriate or inappropriate, were associated with increasing "persistence."

Conclusions: In an area of rapidly changing information, such as the risks and benefits of HT, knowledge is low. Experiential learning appropriately influences attitudes, while pharmaceutical detailing was associated with inappropriate attitudes toward HT risks.

Background

Over the past 5 years, indications for the use of hormone therapy (HT) have dramatically changed. Before 1998, HT was widely accepted as both cardioprotective and beneficial to bone density (Davidson et al., 2000; The Writing Group for the PEPI Trial, 1995; The Writing Group for the PEPI Trial, 1996;

Grodstein et al., 2000; Scuteri et al., 2001). As a result, the majority of postmenopausal women were offered HT in an effort to prevent disease. Potential benefits were assumed to be greater than risks, which included concerns for increases in the incidence of breast cancer, endometrial cancer in women with an intact uterus, and thromboembolic complications (Collaborative Group on Hormonal Factors in Breast Cancer, 1997; The Writing Group for the PEPI Trial, 1995; Grady et al., 2000; Women's Health Initiative, 2002). In 1998, the Heart Estrogen/progestin Replacement Study (HERS) called into question the use of HT for

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the secondary prevention of cardiac disease (Hulley et al., 1998) and a reanalysis of data from one of the initial cohort studies, the Nurses' Health Study, also questioned the benefits of HT in women with preexisting cardiac disease (Grodstein, Manson, & Stampfer, 2001). As a result of these studies and the Women's Health Initiative (Women's Health Initiative, 2002), released after our research was conducted, guidelines for menopause management have undergone scrutiny and change. The impact of these initial changes in the understanding of HT on physician's attitudes about HT in menopausal management is uncertain. We sought to understand the process of change in physician decision making as knowledge and guidelines evolved during the period between HERS and WHI.

Three previous studies have examined physicians' attitudes toward HT, two of which were conducted prior to the release of the 1998 HERS data (Newton et al., 2001; Nikolajevic-Sarunac et al., 1999). In the first study, among almost 300 physicians in a staff-model health maintenance organization in the state of Washington, Newton and colleagues found that HT was more likely to be prescribed by female physicians and by physicians with a positive attitude toward the perceived benefits of HT (Newton et al., 2001). In the other, Nikolajevic-Sarunac and associates surveyed a group of physicians in Newcastle, Australia and found that these physicians were more likely to prescribe HT to women with higher risks of osteoporosis and coronary artery disease and lower risks of breast cancer suggesting a strong belief in the cardiac and bone benefits of HT and a concern about breast cancer risk (Nikolajevic-Sarunac et al., 1999). After the release of the HERS data, a survey of the primary authors of articles related to the use of HT for cardioprotection found that one-third of the authors still believed that HT was beneficial for this purpose despite growing evidence to the contrary (Rozenberg, Fellemans, & Ham, 2001). Recent evidence also shows that prescriptions for HT are declining (Hersh, Stefanick, & Stafford, 2004).

The use of HT has continued to evolve with the release of preliminary data from the WHI (Women's Health Initiative, 2002). Given the changing information about the risks and benefits of HT, as well as the changing clinical guidelines, we sought to reexamine the relationship among aspects of residency education addressing HT, knowledge about the use of HT, and attitudes toward HT. We hypothesized that physicians who had more accurate knowledge about HT use would have more appropriate attitudes: positive attitude about HT benefits (alleviation of menopausal symptoms and prevention of osteoporosis) and more concern about HT risks (increased incidence of heart disease, breast cancer, and thromboembolic complications). Education would enhance appropriate atti-

tudes. We conducted a survey to test this hypothesis and to explore the influence that demographics, didactic training, and clinical experience have on attitudes toward HT.

Methods

Study participants and sites

We surveyed the internal medicine residents at the University of Pittsburgh Medical Center (UPMC) between February 2002 and April 2002, prior to the release of the Women's Health Initiative. UPMC has two residency programs. The university program is affiliated with an urban teaching hospital and includes a Veterans Administration hospital, while the community program is based at a smaller community hospital. Residents in both programs spend time at all hospitals. Within each program, the University of Pittsburgh offers various residency training tracks, including a traditional categorical program and three nontraditional tracks: a primary care track; a women's health track; and a combined, 4-year, internal medicine-pediatrics track. Categorical and primary care residents can be in either the university or community program, whereas all women's health residents are in the university program and all medicine-pediatrics residents are in the community program. The primary care, women's health, and internal medicine-pediatrics residents spend extra time in the outpatient setting and participate to a varying degree in specific educational programs on topics of contraception and menopause management.

During the period of the survey, UPMC had a total of 92 second-, third-, and fourth-year internal medicine residents.

Study procedures

After the Institutional Review Board of the University of Pittsburgh approved our study, we invited each of the second-, third-, and fourth-year internal medicine residents to participate in the survey. Because of its anonymous nature, the survey was exempt from informed consent.

We approached residents in person prior to their outpatient continuity clinics or sent them a survey via the UPMC internal mail system. We provided them with written information about the study and gave them a copy of the survey instrument to complete either during the clinic session or within 1 week of survey receipt. We asked them to return the completed survey at the site of administration or to a designated office location. There was no monetary incentive for completing the survey.

Study instrument

The survey consisted of four domains: (1) questions eliciting demographic data on characteristics of the resident and his or her chosen residency track; (2) questions concerning the types of training that the resident had received about menopause management, including didactic (i.e., lectures, workshops, self-directed study, and detailing by pharmaceutical representatives) and experiential (e.g., clinic rotations in which menopause and HT were discussed, such as Women's Health, and number of female patients in continuity setting); (3) questions evaluating the resident's knowledge about menopause management and HT; and (4) questions about attitudes toward menopause management and HT. During the study, we used the term "hormone replacement therapy (HRT)," which was the more accepted phrase at that time. We included pharmaceutical detailing in the domain of education because other authors have found that physicians view pharmaceutical representatives as a source, and sometimes the primary source, of education regarding medications (Jones, Greenfield, & Bradley, 2001; McCormick et al., 2001).

Prior to writing the knowledge assessment portion of the survey, we reviewed the current literature (through December 2001) on HT use, HT benefits, HT risks, contraindications to HT use, and alternatives to HT use (Collaborative Group on Hormonal Factors in Breast Cancer, 1997; Cauley et al., 1995; The Writing Group for the PEPI Trial, 1995; The Writing Group for the PEPI Trial, 1996; Grodstein et al., 2000; Grodstein, Manson, & Stampfer, 2001; Herrington et al., 2000; Hodis et al., 2001; Hulley et al., 1998; McNagny, 1999; Mosca et al., 2001; Schairer et al., 2000; Scuteri et al., 2001; Torgerson & Bell-Syer, 2001; Viscoli et al., 2001). Each of our questions was based on one or more of these topics and required a single best answer. Questions followed a true-false or multiple-choice format. Multiple-choice questions included questions around a clinical vignette. Members of the Section on Women's Health (a section of the Division of General Internal Medicine in the Department of Medicine) at the University of Pittsburgh reviewed the questions for content and clarity. Additional faculty with expertise in survey design provided input regarding question structure and layout.

We received permission from members of the Seattle Group Health Cooperative to use a modified version of an instrument that they had developed to examine attitudes influencing the frequency with which HT is prescribed (Newton et al., 2001). The instrument addressed attitudes toward HT use in a variety of hypothetical women including those with a comorbid medical condition (e.g., diabetes, hypertension, coronary disease, breast cancer, or osteoporosis) and/or a family history of heart disease, breast cancer, or Alzheimer's disease. The instrument also addressed

"persistence" in continuing HT in a woman who expressed reservations. Attitude questions were scored on 4- and 5-point Likert scales.

Statistical analyses

We used descriptive statistics to examine the data concerning demographics, residency track, and didactic training about menopause management. To calculate knowledge scores, we divided the number of correctly answered questions by the total number of answered questions for a percent correct score (possible range 0–100%). Knowledge scores were normally distributed. A score of greater than 50% was considered "knowledgeable."

To identify and categorize attitudinal factors influencing HT use, we removed the previously identified "persistence" factor (Newton et al., 2001) and then conducted principal factors analysis. Through examination of the skree plot, we determined that a three-factor solution was the most parsimonious. The three factors include: "HT benefits" (beliefs about symptom management and osteoporosis); "HT cardiac risks" (beliefs about cardiac protection); and "HT noncardiac risks" (beliefs about thrombosis and breast cancer). Tests of reliability indicated adequate internal consistency among all scales, with "persistence," "HT benefits," "HT cardiac risks," and "HT noncardiac risks" having Cronbach α levels of .84, .82, .71, and .71, respectively.

"Persistence" and attitudes were examined for appropriateness based on information about the risks and benefits of HT, as understood between HERS and WHI. Given the changing balance of risks and benefits, it became clear that a universal recommendation to use HT is no longer appropriate. It is appropriate to individualize prescribing to include concern about the risks of HT, while considering useful aspects of HT including management of vasomotor symptoms and osteoporosis risks. We therefore consider appropriate attitudes to include: nonpersistence (an ability to individualize prescribing recommendations); higher scores on the "HT benefits" scale; and lower scores on the "HT cardiac risks" and "HT noncardiac risks" scales.

We considered "persistence" to represent a surrogate for prescribing practices. To examine the relationship among demographics, residency track, didactic training, knowledge, "persistence," and the three attitudinal factors, we initially conducted univariable linear regression analyses. Subsequently we constructed multivariable linear regression models including any variable that had an α level \leq .25 in univariable testing. Variables in multivariable models were considered significant at an α level \leq .05. In a similar manner, we examined how our attitudinal factors affected the self-reported "persistence" of respondents in recommending HT. The analysis was

Table 1. Demographic characteristics

Characteristic	Number	Percentage
Gender		
Male	43	62
Female	26	38
Race		
White	29	42
Black	3	4
Hispanic	3	4
Asian/Pacific Islander	28	41
Other	6	9
Primary hospital location		
University	41	59
Community	28	41
Residency track*		
Traditional: categorical	54	79
Nontraditional		
Primary care	7	10
Women's health	3	5
Internal medicine and pediatrics	4	6
Year in training		
PGY-2	35	51
PGY-3	31	45
PGY-4	3	4

PGY, Postgraduate year.

*Traditional residency track: categorical internal medicine training; nontraditional residency track (i.e., women's health, internal medicine-pediatrics, primary care).

conducted using STATA, version 7.0 (STATA Corp., College Station, Texas).

Results

Sixty-nine of the 92 residents (75%) completed the survey. Gender and race of the respondents did not differ significantly from those of the overall resident group (62% vs. 58% male and 42% vs. 39% white; $p = .55$ and $p = .71$, respectively). Similar to the composition of the UPMC residency program composition, most residents were in traditional categorical program (79% vs. 21%) and more were in university than community hospitals (59% vs. 41%). Because of the survey's anonymous nature, we were unable to calculate the difference in response rate based on the site of administration (clinic versus mail; Table 1).

Residents had significant exposure to didactic training in menopause management, with 99% attending a lecture on the topic, 72% engaging in self-directed study, 30% reporting exposure to pharmaceutical detailing, and 22% attending a half-day workshop or seminar. Eighty percent of residents had more than one didactic exposure (46% two exposures, 22% three exposures, and 12% four exposures). Increasing numbers of exposures did not significantly impact knowledge ($p = .55$). Although 75% of residents report having a clinical rotation during which menopause or HT was discussed, most residents (66%) reported that

postmenopausal women accounted for less than 30% of their outpatient population (Table 2).

Despite this significant didactic exposure, overall knowledge was poor, with an average knowledge score of $47 \pm 16\%$ SD. Only 26% of residents felt prepared to counsel women about HT (score of >2 , indicating feeling somewhat prepared, on a 4-point Likert scale). Residents with more knowledge tended to feel more prepared to counsel women ($p = .058$).

Overall, despite low knowledge and low comfort with prescribing, residents were persistent in recommending HT to women who expressed reservations (average score of 2.9, indicating likely to persist, on a 4-point Likert scale). When residents were asked to rate their beliefs on a 5-point Likert scale, in which 1 indicated strongly disagree and 5 indicated strongly agree with the use of HT in populations of women, they tended to disagree with the use of HT in patients represented by the "HT noncardiac risks" (high risk of breast cancer or thrombosis) questions (average score of 2.1), to agree with the use of HT for patients represented by the "HT benefits" (e.g., symptom management and osteoporosis) questions (average score of 3.6), and to feel uncertain about the use of HT for patients represented by the "HT cardiac risks" questions (average score of 3). Please see Table 3.

Univariable analyses

We examined 12 variables that might influence residents' "persistence" and attitudes: the knowledge

Table 2. Educational exposures: exposure present

Type of Exposure	Number	Percentage
Didactic		
Lecture	68	99
Self-study	50	72
Pharmaceutical detailing	21	30
Half-day workshop addressing Menopause and HT	15	22
Total number of didactic exposures		
0	1	1
1	13	19
2	32	46
3	15	22
4	8	12
Experiential		
Postmenopausal women $\geq 30\%$ of continuity practice	23	34
Clinical rotation discussing menopause and HT	52	75
Track		
Traditional	54	79
Nontraditional	14	21
Number of half-days in clinical practice		
1	43	62
2	26	38
Primary hospital site		
University	41	59
Community	28	41

Table 3. Attitudes about HT risks and benefits and persistence in recommending HT among second-, third-, and fourth-year resident physicians at the University of Pittsburgh, February–April 2002

Characteristic	Mean ± SD	Range
Persistence in recommending HT*	2.9 ± 0.50	1.80–4.00
HT noncardiac risks (e.g., thrombosis, breast cancer)	2.1 ± 0.67	1.0–4.00
HT benefits (e.g., menopausal symptoms, osteoporosis)	3.6 ± 0.46	2.75–4.67
HT cardiac risks	3.0 ± 0.78	1.25–5.00

HT cardiac and noncardiac risks: 1 = most agree with risks, 5 = least agree with risks; HT benefits: 1 = least agree with benefits; 5 = most agree with benefits.

*Persistence: 1 = least persistent, 4 = most persistent.

score (knowledge about HT and menopause management); two resident-specific demographic variables (gender and race of respondent); four didactic training variables (lectures, self-directed study, pharmaceutical detailing, and workshops on HT and menopause management); and five experiential training variables (traditional vs. nontraditional residency track, primary hospital site, percentage of postmenopausal women seen in the outpatient setting, rotations, and number of half-days in the outpatient clinic).

In univariable analysis, knowledge and race of provider were not significantly related to “persistence” or any of the attitudinal factors. Male gender was associated with less concern about the noncardiac risks (thrombosis and breast cancer) as measured by the “HT noncardiac risks” scale ($p = .002$), but gender did not influence the other scales.

Didactic and experiential training had mixed influences on “persistence” and attitudinal factors. Variables associated with more appropriate attitudes included attending a lecture (less “persistence,” $p = .02$), seeing a patient population with more than 30% postmenopausal women (more disagreement with the use of HT in patients represented by the “HT noncardiac risks” scale, $p \leq .001$), and having a rotation in menopause management (more disagreement with the use of HT in patients represented by the “HT noncardiac risks” scale, $p = .046$). Variables with a mixed profile included self-directed study (more “persistence,” $p = .047$ but more agreement with the “HT benefits” scale, $P = .07$) and pharmaceutical detailing (more agreement with the use of HT in patients represented by both the “HT benefits” scale and the “HT cardiac risks” scale, $p = .07$ and $p = .03$, respectively).

We then examined the impact of attitudes toward HT on self-reported “persistence.” In univariable analysis, we found feeling increasingly positive (more likely to use HT for beneficial effects as well as in patients with cardiac and noncardiac risks) on all attitudinal scales was, as expected, associated with

more “persistence” (“HT benefits” $p < .001$, “HT cardiac risks” $p = .047$, and “HT noncardiac risks” $p = .07$).

Multivariable analyses

In multivariable analyses, we controlled for respondent race and gender. The results were similar to those seen in univariable analyses. More appropriate attitudes were linked with: 1) attending a lecture (less “persistence,” $p = .003$); 2) having a rotation that includes a discussion of menopause management (less “persistence” and more disagreement with the use of HT in patients represented by the “HT noncardiac risks” scale, $p = .04$ for each); and 3) seeing a patient population with more than 30% postmenopausal women (more disagreement with the use of HT in patients represented by the “HT noncardiac risks” scale, $p = .002$). Less appropriate attitudes were associated with: 1) self-directed study (more “persistence,” $p = .003$) and 2) pharmaceutical detailing (more willingness to use HT in patients represented by the “HT cardiac risks” scale, $p = .03$; Table 4).

Finally, we examined the relationship between attitudes (HT benefits, HT cardiac risks, and HT noncardiac risks) and “persistence,” our surrogate for prescribing practices, in a multivariable linear regression model. More agreement with the use of HT for patients described on both the “HT benefits” and “HT noncardiac risks” scales continued to predict “persistence,” while attitudes on the “HT risks cardiac” scale were no longer significant ($p < .001$, $p = .04$, and $p = .48$, respectively).

Table 4. Variables significantly associated with HT attitudes among 69 second-, third-, and fourth-year resident physicians at the University of Pittsburgh, February–April 2002*

Attitude**	Exposure	Exposure Present (Mean Likert Value)		p Value for Difference
		Yes	No	
Persistence in recommending HT	Lecture	2.9	4.0	.003
	Clinical rotation discussing menopause and HT	2.8	3.0	.040
	Self-study	3.0	2.7	.003
HT noncardiac risks (e.g., thrombosis, breast cancer)	Clinical rotation discussing menopause and HT	2.0	2.4	.040
	Postmenopausal women \geq 30% of continuity practice	1.7	2.3	.002
	HT cardiac risks			
	Pharmaceutical detailing	3.3	2.9	.030

*Controlling for gender and race.

**Persistence: 1 = least persistent, 4 = most persistent; HT cardiac and noncardiac risks: 1 = most agree with risks, 5 = least agree with risks.

Discussion

Studies have shown that the use of HT is influenced by physicians' attitudes and beliefs about HT's benefits and risks (Newton et al., 2001). After the 1998 release of HERS (Hulley et al., 1998), when research results began to question the cardioprotective benefits of HT, guidelines for menopause management underwent serious scrutiny. Subsequently, organizations reversed prior recommendations and counseled against prescribing HT for secondary prevention of cardiac disease (The North American Menopause Society, 2000). The timing of our research offers an interesting insight into the process of change of physicians' attitudes about HT in a time of changing knowledge and recommendations.

In our survey of residents at university and community hospitals, we hypothesized that respondents who had more educational exposure to HT and more up-to-date knowledge about HT would have a more appropriate attitudes toward HT benefits (appreciate alleviation of menopausal symptoms and prevention of osteoporosis) and risks (worry about increased incidence of heart disease, breast cancer, and thromboembolic complications). However, we found no significant association between knowledge and appropriateness of attitude. The lack of association may be a result of generally low knowledge in our population, or it may be a reflection of physicians' uncertainty concerning HT, with higher levels of knowledge resulting in higher levels of uncertainty. Our study does not shed light on the cause for this lack of association.

Although Newton and colleagues (Newton et al., 2001) found that male physicians were about 30% as likely as female physicians to prescribe HT, we did not find that gender played a large role in influencing "persistence" or attitudes about HT. Perhaps male and female physicians do have different prescribing practices but not different attitudes, or perhaps emerging evidence is making female physicians feel more negative toward HT and will change their prescribing practices in the future.

In our study reported here, only experiential training that involved direct patient contact (seeing a patient population with more than 30% postmenopausal women in the outpatient setting and a clinical rotation, such as Women's Health, in which menopause management was discussed) had a significant association with appropriate attitudes. This finding supports the American Board of Internal Medicine requirement of 25% gender-specific care as a necessary component of residency training to ensure competence in the care of women patients (Program Requirements for Residency Education in Internal Medicine, 2002). In our previous research (Hess et al., 2004) we found an association between other experiential exposures (such as being in a nontraditional internal med-

icine residency training track, such as women's health, primary care, and joint internal medicine and pediatrics) and absolute knowledge scores. It appears that these other experiential exposures are less important in shaping attitudes and "persistence" than is having a significant continuity experience with women patients.

We found that didactic training had a greater influence on attitudes. Three associations were significant. First, physicians exposed to organized academic endeavors, such as lectures, tended to be less persistent in recommending HT and more likely to express concerns about using HT in patients with risks identified by the "HT noncardiac risks" scale. Second, physicians who engaged in self-directed study tended to be more persistent and more apt to respond positively on the "HT benefits" scale. This second observation may reflect the fact that people are more likely to independently pursue knowledge about a topic in which they already have a strong or positive interest or that in an area of rapidly changing knowledge, they consulted outdated materials. Third, physicians exposed to pharmaceutical detailing about HT felt more positive about the use of HT for both its well-recognized benefits and its now disputed cardioprotective effects. Our study was conducted before the release of the Women's Health Initiative results, which cast a negative light on the use of HT for primary cardiac protection (Women's Health Initiative, 2002) but after the release of the HERS results, which showed that there was no benefit to using HT for secondary cardiac protection (Hulley et al., 1998). Industries generally place a positive spin on the use of their products, so it would not be unusual for the pharmaceutical industry to place a positive spin on the use of medications that it is trying to sell. It is unclear if pharmaceutical detailing has a different impact on residents than on more experienced physicians or if our finding in residents would hold true in other physician populations. In any case, medical educators should take note of and utilize the types of techniques that are successfully employed by the pharmaceutical industry to influence attitudes. Additionally, educators should acknowledge the powerful influence of industry on resident physicians and work both to minimize exposure and correct misconceptions.

Finally, agreeing with the use of HT in women with and without risk factors was linked with increased "persistence" in recommending HT despite patient reservations. Either overvaluing the benefits or undervaluing the risks may result in this effect. We believe that the attitudinal factors we identified reflect residents' current perception of the HT literature. Additionally, "persistence" may be an adequate surrogate for prescribing practices (Newton et al., 2001). This implies that extremely positive attitudes, if inappropriate, will result in inappropriate prescribing pat-

terns and that educational efforts in residency training known to influence attitudes, such as appropriate patient mix and pharmaceutical style educational techniques, should be utilized by programs to address misconceptions.

Our study has several limitations. First, the study uses a new survey instrument. The Section of Women's Health at UPMC reviewed all survey questions for content validity and clarity prior to use, but some of the questions still contained prominent distracters. Second, while other studies have reported that positive attitudes about HT correlate with physician prescribing practices, our study does not explore these correlations. We use "persistence," a factor identified by other investigators as related to prescribing practices, as a surrogate. Third, our study was conducted at a time of great uncertainty about HT, and this may have influenced the residents' willingness to be extremely positive or extremely negative in their responses. Fourth, the study was conducted in a relatively small sample of residents who work in university and community hospitals and clinics affiliated with a single health system. The Section of Women's Health at UPMC is quite visible, and this may decrease differences among groups of residents or may improve the residents' overall knowledge of HT and women's health. Residents are just one subset of physicians, and more experienced physicians may respond differently to survey questions. To increase the generalizability of our study, we plan to repeat the survey in a second, larger population of practicing physicians.

We believe that the results of our study shed light on attitudes toward HT and that they may also help elucidate the processes by which attitudes are formed and influenced in response to rapidly changing medical information.

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