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Sex disparities in the effect of statins on lipid parameters

The PharmLines Initiative

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Abstract

Real-world evidence on a potential statin effect modification by sex is inconclusive, especially for the primary prevention of cardiovascular disease (CVD). We aimed to quantify the differences in the effect of statins on lipid parameters between men and women.

The PharmLines Initiative linked the Lifelines Cohort Study and the IADB.nl prescription database. This database covers a representative population from the Netherlands. We selected participants aged ≥40 years at the index date: the date of the first prescription of any statin monotherapy in the study period 2006 to 2017. Multivariate regression modeling was used to compare the difference of the mean percentage change of lipid parameters (% mean difference [MD]) from baseline to follow-up measurement between the sexes.

Out of 5366 statin users from approximately 50,000 participants available in the final linked database, 685 were statin initiators. At baseline, women had significantly higher levels of mean total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) than men (all P values $<.01$). At follow-up, women had a significantly higher mean percentage change of HDL-C compared to men (adjusted % MD 5.59, 95% confidence interval [CI] 2.42-8.75, $P<.01$). There was no significant sex difference in other parameters, nor in the proportion of men and women who achieved LDL-C ≤2.5 mmol/L.

Statins appear to have a greater effect on increasing HDL-C levels in women than men while showing similar effect on other lipid parameters in both sexes. Men should not be treated differently than women.

Abbreviations: CI = confidence interval, CVD = cardiovascular disease, HDL-C = high-density lipoprotein cholesterol, LDL-C = low-density lipoprotein cholesterol, MD = mean difference, TC = total cholesterol.

Keywords: drug prescriptions, lipids, medical record linkage, pharmacoepidemiology, sex, statins, treatment outcome

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De-identified individual participant data that underlie the results reported in this study (text, tables, figures, appendices) can be made available upon request immediately following article publication for researchers whose proposed use of the data has been approved by an independent review committee ("learned intermediary") identified for this purpose. Proposal should be directed to: e.hak@rug.nl.

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The data that support the findings of this study are available from a third party, but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are available from the authors upon reasonable request and with permission of the third party.

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1. Introduction

In Europe, cardiovascular disease (CVD) contributes to 40% and 49% of all deaths in men and women, respectively. It burdens 79% of European countries with 40 to 150 disability-adjusted life years per 1000 citizens.[1,2] Statins are the primary lipid-lowering agents recommended by guidelines from the American Heart Association/American College of Cardiology, the European Society of Cardiology, and the Dutch College of General Practitioners to prevent CVD.[3–6] The clinical benefit of statins is mainly due to its ability to reduce low-density lipoprotein cholesterol (LDL-C) concentration. In general, statins should be prescribed for individuals with a 10-year moderate to high risk of developing CVD (primary prevention) based on a total cardiovascular (CV) risk assessment as well as LDL-C concentration, and individuals with established CVD (secondary prevention). These guidelines present different scoring systems to assess an individual's total CV risk and provide a separate scoring chart for men and women.[3,5–7] Despite this, there are no sex-specific guidelines for statin therapy.

Two meta-analyses of randomised controlled trials of statins vs control (placebo/less-intensive dose) showed no sex disparities in the effect of statins on reducing major CV events.[8,9] One review showed the difference in the effects of statins for primary and secondary CVD prevention between sexes to be inconsistent.[10] When it comes to sex disparities in the effect of statins on lipid parameters, meta-analyses show disagreement. One shows that the mean absolute reduction of LDL-C after 1-year of using statin is significantly greater in men than in women. However, for total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C) and triglycerides (TG), this effect was similar between sexes.[8] In the other meta-analysis, women experience a more significant reduction in LDL-C, but a less significant increase in HDL-C, than men.[11]

Studies using real-world data mostly detect sex disparities in CV risk assessment, statin administration, adherence, and adverse effects.[10,12–15] They offer limited explanation of the sex disparities in lipid modification, especially for primary prevention.[10,16] We aimed to investigate disparities in the effectiveness of statins on important lipid parameters between women and men who were first time users of statins for both the primary and secondary prevention of CVD in a real-world setting.

2. Methods

We report our study according to the REporting of studies Conducted using Observational Routinely-collected health Data statement for pharmacoepidemiology.[17]

2.1. Study design and setting

We conducted an inception cohort study using the PharmLines Initiative database that linking data from the Lifelines Cohort Study and the IADB.nl prescription database. The overall design of the Lifelines Cohort Study, the IADB.nl prescription database, and the Pharmlines Initiative have been described elsewhere.[18–22]

Lifelines is a population-based database established to investigate the contribution of socio-demographic, physical, psychological, biomedical, and behavioural factors to the development of disease and health of general population living in the North of the Netherlands.[18,20,22] IADB.nl is a population-based database that has been prospectively collecting prescription data from community pharmacies in the Netherlands since 1996. As in 2017, the coverage of the IADB.nl is around 700,000 participants from approximately 70 community pharmacies.[19,21]

IADB.nl supplies full prescription data regardless of health insurance status. It has been extensively used for research and has been found to represent the whole Netherlands in terms of age, sex, and prescription rates. The information stored in the IADB.nl relevant to this study such as the date of birth and sex of each participant, the date of medication being dispensed, the quantity of medication, the dose of medication (in terms of defined daily dose, DDD), and the number of days of valid prescription. Each medication is registered according to the Anatomical Therapeutic Chemical code. The database however records neither medications bought over the counter by the participants nor medications dispensed in the hospital. To maintain confidentiality, a unique anonymous identifier is given to every participant and used to track each participant's prescription record throughout the database.[19,21]

The Lifelines study protocol is approved by the medical ethical committee of the University Medical Center Groningen and all Lifelines participants have each signed an informed consent stating that they approve the use of their (anonymized) data and material for scientific purposes. Data of the IADB.nl is collected according to the national and European guidelines on privacy with human data valid at the time of collection.

2.2. Database linkage

Briefly, the linking process was the responsibility of the trusted third-party, the Netherlands' Central Agency for Statistics (Centraal Bureau voor de Statistiek). The linkage was performed at the individual level based on combined information of 4-digit postal code, sex, and date of birth. A new unique identifier, which could not be tracked back to identifier in the individual databases, then was assigned to each participant.[21]

2.3. Study participants, compared groups, outcomes, and follow-up

We included participants ≥40 years of age at the index date, defined as the date of the first prescription of any statin monotherapy (Anatomical Therapeutic Chemical code C10AA) during the study period (2006-2017). Statin monotherapy was determined by an absence of other lipid-lowering agents at index date. Participants were only included if they were present in the database for at least 365 days before the first prescription of any statins and had both the baseline and follow-up visit recorded in the Lifelines database. Participants were excluded if they had used statins for less than 90 days (Fig. 1).

We further classified the statin initiators into 2 groups: initiators for primary prevention and initiators for secondary prevention of CVD. For the primary prevention group, participants were excluded if they had previously been diagnosed with CVD, as defined by the algorithm developed by van der Ende et al,[18] including the diagnoses of myocardial infarction, cerebrovascular accident, transient ischemic attack, aortic aneurysm, or peripheral artery disease. Men were the reference group for all outcome comparisons.

Our primary outcome was the sex difference in the mean percentage change (% mean difference, %MD) of TC, LDL-C,

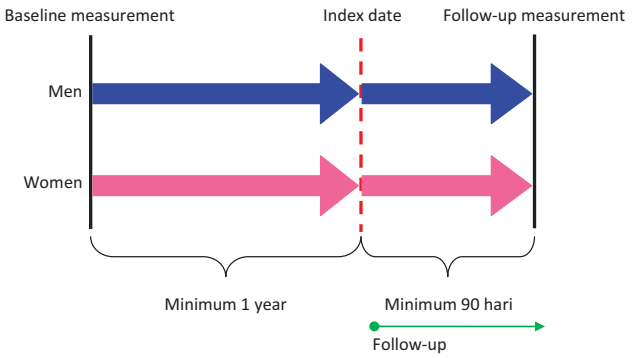

Figure 1. Design of the retrospective inception cohort study.

HDL-C, and TG level from baseline to follow-up and in the achievement of LDL-C treatment target (≤2.5 mmol/L), as recommended by the 2011 Dutch guidelines, for the all-statin initiator group,[4,23] As described previously, Roche Modular P automated analyzer (Mannheim, Germany) was used to measure lipid parameters. The plasma cholesterol used in clinical chemistry analyses was obtained from blood veins after an overnight fast. TC, LDL-C, and HDL-C were measured with direct enzymatic colorimetric assays whereas TG was measured with an assay based on glycerol phosphate oxidase-peroxidase aminophenazone. All assays were standardized. Friedewald formula was used to calculate LDL-C.[24]

As secondary outcomes, we measured the sex differences in the effect of statins separately for primary and secondary prevention and in participants' adherence to statins. Adherence was calculated as the proportion days covered where the number of days covered with statin prescriptions were divided by the number of days between index date and follow-up multiplied by 100. Participants were classified as adherent when proportion days covered was ≥80%.[25]

2.4. Statistical analyses

Proportions for categorical variables, mean ± standard deviation for normally distributed continuous variables, and median and interquartile range for skewed continuous variables are reported. Chi-square tests, independent sample *t* tests, and Mann–Whitney *U* tests were used to compare categorical variables, normally-distributed continuous variables, and skewed variables, respectively. The distribution of variables were determined using P-P, Q-Q plots and stem and leaf plots, where outliers were identified and subsequently removed. A complete case analysis was performed to account for any sporadically missing data in the confounder and outcome variables. A potential for collinearity between dependent and independent variables were examined before the linear regression analyses were performed. We looked at the Pearson correlation score (r) and the variance inflation factor (VIF) to detect multicollinearity. The presence of multi-collinearity was suggested when $r > 0.90$ and VIF score > 10.[26]

We report %MD ± standard errors from linear regression, odds ratios from logistic regression, and their 95% confidence intervals (95% CI). Statistically significant co-variables ($P < .05$) in univariate analysis were included in multivariate linear and logistic regression analyses. IBM Statistical Package for Social Sciences Statistics 22 (IBM Corp., Armonk, N.Y., USA) was used to perform all statistical analyses.

3. Indirect patient and public involvement

Patients and public were involved in the development of the Lifelines database. Patient representatives were involved in the updating of the database.

4. Results

Out of around 50,000 participants available in the linked database, 5366 were statin users. Of these, 571 participants were first time statin users in the study period. Among these participants, 282 (49.4%) were men and 464 (81.3%) had initiated statins for primary prevention (Fig. 2). The year of the

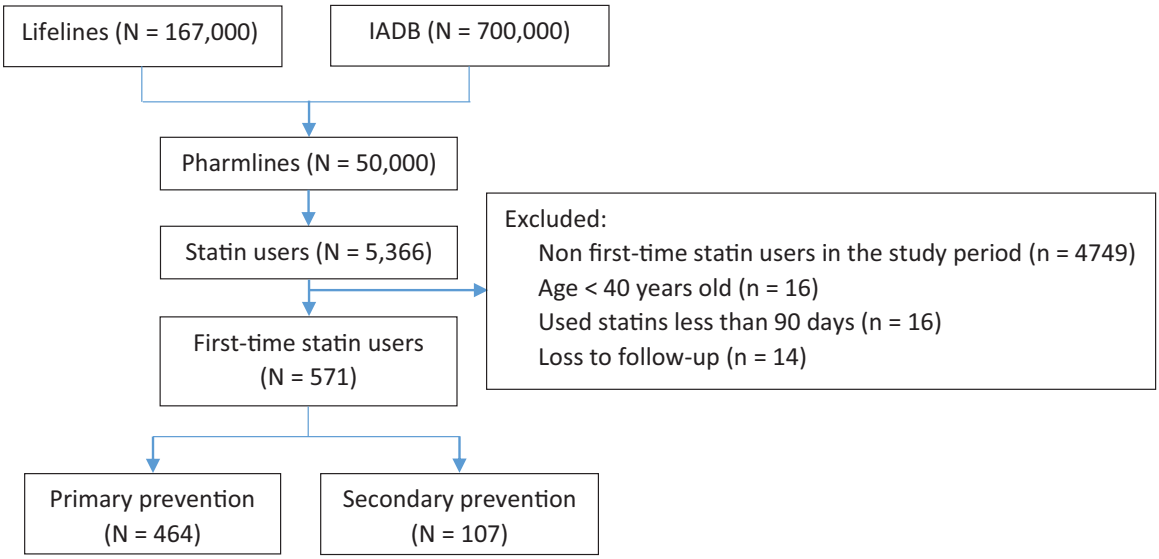

Figure 2. Flow diagram of the selection of participants.

Table 1

Baseline characteristics of the all statin initiator group.

Variables (unit)	Men (N = 282) Mean ± SD	Women (N = 289) Mean ± SD	*P* value
Age (yrs)	53 (48, 64)*	57 (49, 66)*	.072
BMI (kg/m^2)	27.44 ± 3.47	27.74 ± 4.85	.400
SBP (mm Hg)	137.70 ± 16.01	131.87 ± 18.18	**<.001**
DBP (mm Hg)	81.25 ± 9.94	75.14 ± 9.09	**<.001**
Baseline lipid parameters			
TC (mmol/L)	5.96 ± 1.12	6.36 ± 1.17	**<.001**
LDL-C (mmol/L)	4.08 ± 1.02	4.33 ± 1.09	**.004**
HDL-C (mmol/L)	1.26 ± 0.31	1.50 ± 0.42	**<.001**
TG (mmol/L)	1.93 ± 1.72	1.69 ± 1.11	.055
Starting dose of statins (mg)†			
Simvastatin	34.14 ± 9.59 (n = 258)	32.50 ± 10.81 (n = 260)	.067
Atorvastatin	23.33 ± 11.13 (n = 15)	30 ± 12.40 (n = 14)	.139
Duration of follow-up (d)	844.50 (508.5, 1209)*	978.00 (585, 1263)*	**.017**
Cardiovascular risk factors	n (%)	n (%)	
Current smokers	42 (14.89)	42 (14.53)	.918
Hypertension	94 (33.33)	118 (40.83)	**.032**
Hypercholesterolemia	81 (28.72)	91 (31.49)	.255
Diabetes mellitus	11 (3.90)	15 (5.19)	.312

BMI = body mass index, DBP = diastolic blood pressure, HDL-C = high-density-lipoprotein cholesterol, LDL-C = low-density lipoprotein cholesterol, N = number of participants included in the analysis, n = number of participants with the displayed variable, SBP = systolic blood pressure, SD = standard deviation, TC = total cholesterol, TG = triglycerides.

* Median (25th, 75th percentiles).

† Pravastatin and rosuvastatin were not included in the analysis because they were used by less than 10 participants in 1 or both groups.

Lifelines baseline appointments ranged from 2006 to 2013 and the Lifelines follow-up appointments ranged from 2014 to 2017. Between these 2 periods, the time of statin initiations ranged from May 11, 2006 to August 4, 2016. The overall mean duration between the baseline measurement date and the index date was 710.66 ± 638 days. The overall mean duration of follow-up was 928.97 ± 484.70 days. Simvastatin was used the most by both men (91.5%) and women (90.0%).

Compared to men, women were significantly older, and had higher levels of most lipid parameters including TC, LDL-C, and HDL-C at baseline (Table 1). Men had significantly higher mean systolic and diastolic blood pressure. There were no differences in mean body mass index, smoking status, the presence of diabetes and hypercholesterolemia, and the mean starting dose of statins between the sexes at baseline. However, although the mean duration of follow-up between the sexes was not significantly different, the median of follow-up in women was significantly longer than in men.

4.1. Sex disparities in the effect of statins on lipid parameters

After adjustments for potential confounders, in both men and women separately, statins significantly decreased the levels of TC and LDL-C, and increased the level of HDL-C from baseline to follow-up (Table 2). However, there was a more significantly improved HDL-C level in women compared to men in the adjusted pairwise comparison (adjusted MD 5.64%, 95% CI 2.36-8.92, $P < .01$), the differences in the mean percentage change of TC, LDL-C, and TG from baseline between the sexes were not statistically significant. The proportion of men and women who attained the LDL-C treatment target was similar, only 37% for both groups. The adherent rates were moderate (73.1% in men and 72.0% in women) and also similar between the sexes (Table 3).

In line with the all-statin initiator group results, statin use in the primary and secondary prevention subgroups, were found to increase the HDL-C level to a significantly greater extent in women than in men (all P values $< .05$; primary prevention: adjusted MD 4.82%, 95% CI 1.10-8.54; secondary prevention: adjusted MD 8.79%, 95% CI 1.66, 15.93; Table S1, Supplemental Digital Content, http://links.lww.com/MD2/A798). There were no significant differences between the sexes in the mean percentage change from baseline for other lipid parameters, the achievement LDL-C treatment goal, or adherence to statin therapy both in subgroups of primary and secondary prevention (Table S2, Supplemental Digital Content, http://links.lww.com/MD2/A799 and Table S3, Supplemental Digital Content, http://links.lww.com/MD2/A800).

5. Discussion

In all statin users, we found a significantly greater mean percentage increase in HDL-C concentration after initiating statin therapy in women compared to men and no statistically

Table 2

Comparison of the effect of statins between the sexes on lipid parameters in the all statin initiator group.

Lipid parameters (mmol/L)	Groups	Unadjusted N	Unadjusted MD ± SE (%)	Unadjusted 95% CI	Unadjusted *P* value	Adjusted N	Adjusted MD ± SE (%)	Adjusted 95% CI	Adjusted *P* value
TC	Sex difference	543	1.13 ± 1.56	−1.93, 4.18	.470	542	−0.43 ± 1.56	−2.63, 3.48	.784*
	Men	272	−20.99 ± 1.02	−23.15, −18.83		272	−21.80 ± 1.05	−23.85, −19.74	
	Women	271	−22.11 ± 1.17	−24.40, 19.82		270	−21.37 ± 1.05	−23.43, −19.31	
LDL-C	Sex difference	543	2.36 ± 2.34	−2.24, 6.97	.315	542	−0.61 ± 2.36	−5.25, 4.03	.797†
	Men	272	−26.05 ± 1.44	−28.87, −23.23		272	−27.58 ± 1.59	−30.70, −24.46	
	Women	271	−28.41 ± 1.85	−32.04. −24.78		270	−26.97 ± 1.59	−30.10, −23.84	
HDL-C	Sex difference	543	−2.14 ± 1.56	−5.21, 0.93	.171	542	−5.64 ± 1.67	−8.92, −2.36	**.001**†
	Men	272	5.74 ± 1.03	3.32, 7.35		272	3.59 ± 1.12	1.38, 5.79	
	Women	271	7.47 ± 1.18	5.17, 9.77		270	9.23 ± 1.13	7.02, 11.44	
TG	Sex difference	543	−8.32 ± 4.00	−16.18, −0.45	**.038**	542	7.60 ± 4.24	0.73, 15.92	.073†
	Men	272	−2.56 ± 3.38	−9.19, 4.07		272	−2.89 ± 2.85	−8.48, 2.70	
	Women	271	−10.87 ± 2.14	−15.06, 6.68		270	−10.49 ± 2.86	−16.10, 4.88	

CI = confidence interval, DBP = diastolic blood pressure, HDL-C = high-density lipoprotein cholesterol, LDL-C = low-density lipoprotein cholesterol, MD = mean difference, N = number of participants included in the analysis, n = number of participants with the displayed lipid parameter, SBP = systolic blood pressure, SE = standard error, TC = total cholesterol, TG = triglycerides.

* Adjusted for age, SBP, DBP, TC, HDL-C, TG, and starting dose of simvastatin at baseline.

† Adjusted for age, SBP, DBP, LDL-C, HDL-C, TG, and starting dose of simvastatin at baseline.

Table 3

Comparison of the effect of statins on the achievement of treatment goal and adherence to statins between the sexes in the all statin initiator group.

Outcomes	Men (n/N, %)	Women (n/N, %)	OR (95% CI; *P* value)
Achieving treatment goal (LDL-C $\leq$ 2.5 mmol/L)	105/282, 37.2%	101/289, 37.4%	Crude: 1.01 (0.72, 1.41; .970) Adjusted: 1.22 (0.82, 1.82; .322)*
Adherence to statins (PDC $\geq$ 80%)	206/282, 73.1%	208/289, 72.0%	Crude: 0.96 (0.66, 1.39; .830) Adjusted: 0.96 (0.64,1.46; .854)*

CI = confidence interval, DBP = diastolic blood pressure, HDL-C = high-density lipoprotein cholesterol, LDL-C = low-density lipoprotein cholesterol, N = number of participants included in the analysis, n = number of participants with the outcome variable, OR = odds ratio, PDC = proportion days covered, SBP = systolic blood pressure, TG = triglycerides.

* Adjusted for age, SBP, DBP, LDL-C, HDL-C, TG, and starting dose of simvastatin at baseline.

significant differences between the sexes regarding the other lipid parameters. Remarkably, the proportion of men and women who achieved the LDL-C treatment goal was below 40% without statistically significant differences between the sexes. In the primary prevention group the level of attainment of LDL-C treatment target was even lower than 35% for both sexes. However, in the secondary prevention group, the proportion of men and women who reached the treatment target was above 45%, although the differences were not significant between the sexes. Despite the low rate of achievement of the treatment target, the level of adherence to statins was 70% in both sexes.

Our findings contradict results from the meta-analysis of clinical trials by Karlson et al[11] where statins led to a significantly greater increase of 0.5% in the HDL-C mean percentage from baseline in men compared to women. Additionally, this meta-analysis found a significantly greater decrease of 2.1% in the LDL-C mean percentage from baseline in women compared to men.[11] On the other hand, in agreement with our findings, the Cholesterol Treatment Trialist' Collaboration's meta analysis demonstrated similar trend of statin effects on the change in mean percentages of TC, LDL-C, and HDL-C from baseline to 1-year follow up between the sexes.[8]

The more significant effect of statins to raise HDL-C in women than in men despite the small sample size in our study is an interesting finding. HDL-C response to statins has been investigated in an individual participant meta-analysis of clinical trials in the VOYAGER database.[11,27] There was a significant low-to-moderate correlation between the change in HDL-C percentage and the change in the TG percentage, both from baseline to follow-up, induced by statin therapy. The greater the reduction in TG percentage, the greater the increase in HDL-C percentage. However, this study did not differentiate whether there was a difference of this phenomenon between men and women.[27] In our study there was a trend toward greater decrease in TG level in women compared to men, though statistically nonsignificant, was accompanied by a greater increase of HDL-C level in women compared to men. The underlying mechanism of this relationship is unclear.

Low baseline HDL-C and high baseline TG were found as independent predictors of a higher percentage change of HDL-C from baseline for atorvastatin, rosuvastatin, and simvastatin.[27,28] Women in our study had a higher baseline HDL-C and a lower baseline TG compared to men, yet they still demonstrated a greater HDL-C response to statins. The extent of HDL-C elevation also depends on the type and dose of statins.[27–30] Rosuvastatin (5-40 mg) led to 5.5% to 7.9% increase of HDL-C concentration in a direct dose-dependent relationship whereas atorvastatin (10-80 mg) changed HDL-C level in an inverse dose-dependent relationship (4.5% at the 10 mg to 2.3% at the 80 mg). Simvastatin (10-80 mg) raised HDL-C by 4.2% to 5.3% in a similar fashion to rosuvastatin.[27]

HDL-C response may also depend on the type of patients. In Chinese diabetic patients, atorvastatin, younger age (<65 years), body mass index $\geq$24 kg/m^2 and women with baseline HDL-C >1.29 mmol/L or men with baseline HDL-C >1.03 mmol/L predicted a decrease of HDL-C level after 1-year of statin therapy. Severe atherogenic dyslipidemia (baseline TG $\geq$2.30 mmol/L and HDL-C $\leq$0.88 mmol/L), but not women with TG >1.69 mmol/L and HDL-C $\leq$1.29 mmol/L or men with HDL-C $\leq$1.03 mmol/L, were protective factors against HDL-C decrease in these patients.[29] In our study, other factors might oppose the HDL-C elevating effect of statins in men.

The level of adherence to statin therapy in men (73.1%) and women (72.0%) in our study is considered moderate and similar whereas the proportion of participants who achieved the LDL-C treatment goal is below 40%. These results are consistent with other studies. A recent systematic review (2019) of 16 published studies investigating predictors of statin adherence found that the level of adherence to statin therapy for primary and/or secondary prevention was suboptimal (range: 41.0%-82.7%).[31] One study using the PHARMO, a general practitioner database in the Netherlands, showed that from all population treated with statins on average 1 daily defined dose, 45% did not reached the LDL-c treatment target according to the guidelines. Our study found a lower LDL-C treatment goal attainment although the actual filled-prescription of the drug by the patients could be assessed in the PharmLines database whereas it was not available in the PHARMO database.[32]

Our study provides evidence on the possible differences in the effectiveness of statins between men and women in a real-world setting. Which is especially important for primary prevention, where the current evidence is lacking. The whole population of the Netherlands and the adult population of the North of the Netherlands are each well represented by the data from IADB.nl and Lifelines, respectively.[19,33] The recruitment strategy means the selection bias is low that the results obtained from Lifelines can be applied to the general population.[33]

Our study might lack statistical power to detect smaller differences between sexes due to a relatively small sample size included in the analysis. Only 1% of participants in the final linked database initiated statins between their 2 Lifelines appointments and performing a complete-case analysis contributed to a low precision, notably in subgroups. A lack of information on in-hospital dispensed medications in the IADB database might cause a small number of participants in the secondary prevention group. As Lifelines follow-up is still ongoing and the IADB is ever-evolving and expanding, repeating

this study in the future should yield results with higher statistical power.

There still remains uncertainty surrounding the potential sex differences in the effectiveness of statins. The literature presents a varied picture, but here we find the effects of statins on TC, LDL-C, and TG between the sexes are similar whereas HDL-C response appears to be higher in women than men. This difference could be due to other factors than statin type or dose or adherence which oppose the HDL-C elevating effect of statins in men. The degree to which an increase of HDL-C level corresponds to a reduction in CV major events needs further investigation. In all, the results are compatible with the fact that men should not be treated different with statins than women.

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Author contributions

NBH, JEE, EH, and RAdB contributed to the conception or design of the work. SdV contributed to the statistical analysis. All authors contributed to the acquisition, analysis, or interpretation of the data. NBH, JEE and SI drafted the manuscript. All authors critically revised the manuscript, gave final approval, and agreed to be accountable for all aspects of work ensuring integrity and accuracy.

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Ophthalmology

Khaled Ahmed Abdelrahman graduated from the Ains Shams University School of Medicine in Cairo, Egypt in 1990 and received a master's degree in Ophthalmology in 1995. He received his FRCS in Edinburgh in 2002. Dr. Abdelrahman served as the Chief of Cornea, External Eye Disease and Refractive Surgery and the Medical Director of Magrabi-Riyadh Center until May 2015. He served as a consultant in Suliman Al Habib, Olaya Medical Complex, and currently serves as a consultant at Dallah Hospital.

Dr. Abdelraham is a member of the International Society of Refractive Surgery (ISRS), a member of the American Academy of Ophthalmology (AAO), a member of the European Society of Cataract & Refractive Surgeon (ESCRS), member of the Middle East Africa Council of Ophthalmology (MEACO), member of Saudi Ophthalmology Society (SOS), member of Egyptian Ophthalmology Society (EOS) and also a reviewer in the Journal of Refractive Surgery and Journal of Medicine, a former visiting Professor in King Saud University and a Fellow of Royal College of Surgeons of Edinburgh. Dr. Abdelraham is also the representative of the International Society of Refractive Surgery in Saudi Arabia. He has over 30 years of experience and is a registered ophthalmology consultant in many countries, including the UK, Russia, Egypt, Saudi Arabia, Oman, and Kuwait.

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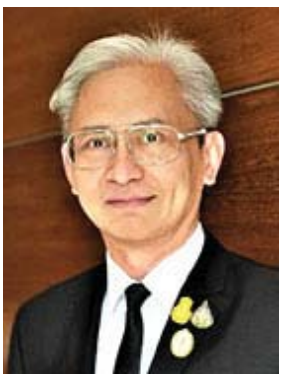
Dr. Somchai Amornyotin, MD

Anesthesiology



Somchai Amornyotin graduated from the Faculty of Medicine Siriraj Hospital, Mahidol University in 1989. He became the staff of the Department of Anesthesiology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand in 1996. Until 2004 he became the associate professor of the Department of Anesthesiology, Faculty of Medicine Siriraj Hospital, Mahidol University. From 2005 until 2009 he was the chief of Anesthesiology Division of Siriraj GI Endoscopy Center, Faculty of Medicine Siriraj Hospital, Mahidol University. His first scientific paper was published in Thailand in 1999.

He has practiced anesthesia for gastrointestinal endoscopy since 2002. He was the committee of Siriraj Gastrointestinal Endoscopy Center, Faculty of Medicine Siriraj Hospital in 2005. More than 90 of his articles have been published in Thai and international medical journals. Dr. Amornyotin is a member and committee of the Royal College of Anesthesiologists of Thailand, the Gastroenterological Association of Thailand, and many scientific societies. He is the reviewer and editor of many international journals.

TOP

Dr. Gunjan Arora, Ph.D.

Clinical Immunology

Gunjan Arora graduated from the University of Delhi and completed research at CSIR-Institute of Genomics and Integrative Biology, New Delhi, India. Dr. Arora's background is in infectious disease and he worked on a wide number of bacterial and parasitic pathogens. Dr. Arora performed his postdoctoral research at Dr. Eric Long's group at NIAID, NIH where he showed the role of natural killer cell-mediated antibody-dependent cellular cytotoxicity against the malaria parasite. Dr. Arora has 10 years of post-PhD experience in global health, immunology, and microbiology. He has 26 publications in peer-reviewed journals about published four book chapters. In the past, he has served as a review for several journals including *Frontiers, MDPI, Nature Press, BMC Microbiology,* and more. Currently, he is working on the immunopathology of Lyme disease and malaria at Yale University.

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Dr. Abdelouahab Bellou, MD, MSc, Ph.D.

Critical Care and Emergency Medicine

Abdelouahab Bellou is Professor of Therapeutics and Emergency Medicine, MD, MSc, Ph.D. (University of Rennes 1, France), Adjunct Professor at the Department of Emergency Medicine, Wayne State University. President of the HealthCare Network & Research Innovation Institute, LLC, USA. Former chair of the Section of Geriatric Emergency Medicine of the European Society for Emergency Medicine (EUSEM) and member of the Research Committee of EUSEM. Founder of the Global Network on Emergency Medicine. Prof. Bellou has been committed to the advancement of emergency medicine. He served as a former president of the European Society for Emergency Medicine; he was involved in the development of EM in Europe. Prof. Bellou's expertise areas include healthcare facility designing, research and innovation, clinical immunology and allergy, emergency medicine education, geriatric emergency medicine, acute cardiac care, ED operations improvement, ED design, and layout. He is also a basic science researcher working on the role of potassium voltage-dependent channels in anaphylactic shock.

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Dr. Eric Bush, MD

Palliative Care

Eric Bush is Board Certified in Internal Medicine, Addiction Medicine and Hospice & Palliative Medicine. He currently lives in Maryland and has been practicing medicine for 17 years. He graduated from the State University of New York at Buffalo in 2004, as a Doctor of Medicine. Prior to this, he attended the State University of New York at Buffalo School of Pharmacy receiving a Bachelor of Science degree in 1994. In 1996, Dr. Bush received a Master's in Business Administration from the State University New York at Buffalo School of Management.

Dr. Bush's healthcare career started in 1988 as a combat medic (& later LPN) in the US Army Reserve. After completing pharmacy school, he practiced as a pharmacist with Roswell Park Cancer Institute in Buffalo, NY; completed Internal Medicine Residency with SUNY Buffalo & subsequently worked as a Fellow and Attending Physician for the Pain and Palliative Care Services at the National Institute of Health in Bethesda, MD; as Medical Director for Capital Caring in Washington, D.C. Medical Director of Hospice with Gilchrist and a Geriatrics Attending Physician at Greater Baltimore Medical Center. Dr. Bush previously served as Medical Director of Frederick Memorial Hospital Pain and Supportive Care Services (obtaining Joint Commission Certification for the Inpatient Palliative Care Service), and Medical Director of Hospice of Frederick County which received national recognition during his tenure in 2015 with the Circle of Life Citation of Honor for Excellence in Hospice and Palliative Care. He also served as the Chairman of the Frederick Memorial Hospital Ethics Committee. Dr. Bush currently serves as an Academic Editor and is the Section Chief for Palliative Care for the online journal Medicine.

Since 2016, Dr. Bush haves served (& continues to do so) as the Chief Medical Officer for Hospice of the Chesapeake & Chesapeake Supportive Care located in Pasadena, Maryland. The organization is a community-based non-profit that serves 1200 seriously ill residents daily in Maryland. The organization attained The Joint Commission's Certification in Community Based Palliative Care (one of only 54 programs nationally with this distinction). Dr. Bush also serves as our organization's Occupational Health Physician and has helped our 300 plus employees navigate the ongoing Covid 19 pandemic. Dr. Bush is also an entrepreneur and the CEO for Hospiceandpalliativeboardreview.com

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Dr. Ovidiu Constantin Baltatu, MD, Ph.D.

Cardiovascular

Ovidiu Constantin Baltatu has enjoyed more than 20 years as an MD/Ph.D. scientist, during which time he has run interdisciplinary translational research teams in both academia and the pharmaceutical industry. He has actively contributed to discoveries in areas of the physiopathology of diseases and new diagnosis, therapeutic, and prevention strategies. Dr. Baltatu is currently affiliated with the Center of Innovation, Technology, and Education (CITE) at Anhembi Morumbi University, Laureate International Universities.

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Dr. Lindsay Cormier, Ph.D.

Drugs and Devices

Lindsay Cormier is an Associate Professor at Eastern Kentucky University and holds a Ph.D. in molecular and biomedical pharmacology and a master's in public health. Her biomedical research laboratory investigates the synthesis and development of novel oncological drugs for cancer diagnosis and treatment. In collaboration, Dr. Cormier has patented cutting-edge pharmaceutical targeting compounds towards reproductive cancers. Her research also investigates the use of hospital protocols related to public health issues including transparency, disease reporting

and tracking, and pharmaceutical use.

TOP

Dr. Ediriweera Desapriya, Ph.D.

Public Health

Ediriweera Desapriya is a research associate in the Emergency Medicine department at the University of British Columbia. Dr. Desapriya received his Ph.D. at the University of Tsukuba and previously worked in Pediatrics at UBC as a research associate and as a professor at the Institute of Social Science University of Tsukuba.

Dr. Desapriya is an internationally recognized researcher in injury prevention with his most notable research involving indicators of automobile accidents and traffic legislation. Dr. Desapriya has received several grants and awards, including but not limited to the Canadian Institute of Health Research-Emergency Department survey on drug-impaired drivers, the Saskatchewan Pediatric Injury Prevention community grant, the Auto 21 Grant Networks of Centers of Excellence, and the Marquis Who's Who in Medicine and Health Care.

Dr. Desapriya has published more than 100 peer-reviewed research articles, 4 chapters, and a book. He is an Editorial Board member of the *World Journal of Clinical Pediatrics* and *Advances in Automobile Engineering*, a contributing editor for *Global Cardiovascular Health Community*, and a member of *the British Medical Journal*'s online forum. Dr. Desapriya is also a member of the Canadian Association for Road Safety Professionals and a member of the Canadian Council of Motor Transport.

TOP

Dr. Jianxun Ding, Ph.D.

Drugs and Devices

Oncology

Jianxun Ding is a professor at Changchun Institute of Applied Chemistry (CIAC), Chinese Academy of Sciences (CAS), P. R. China. He received his B.S. degree from the University of Science and Technology of China in 2007 and obtained his Ph.D. degree at CIAC, CAS, in 2013 under the supervision of Prof. Xuesi Chen. From 2017−2019, he worked with Prof. Omid C. Farokhzad and Prof. Jinjun Shi from Brigham and Women's Hospital, Harvard Medical School, as a postdoctoral research fellow. His research focuses on the synthesis of functional biodegradable polymers, the development of bioresponsive polymer platforms for controlled drug delivery, the exploitation of polymer-based adjuvants for immunotherapy, and

the preparation of polymer scaffolds for regenerative medicine. Dr. Ding has published more than 120 academic articles in mainstream journals, including *Advanced Materials, Progress in Polymer Science, Nano Today, Advanced Functional Materials, ACS Nano, Trends in Biotechnology, Nature Communications, Nano Letters, Biomaterials, Science Bulletin, Journal of Controlled Release*, with over 6,500 citations. He also serves as an Associate Editor *of Frontiers in Biotechnology and Bioengineering, as Editorial Board Members of Polymers, Molecules, Pharmaceutics, PLoS ONE*, and *Current Pharmaceutical Design.*

TOP

Dr. Lydia Eccersley, Ph.D.

Hematology

Lydia Eccersley is a Consultant Haematologist at St Bartholomew's Hospital in London, UK, where she specializes in Haematological malignancies. Dr. Eccersley completed her general hematology training at Hammersmith and Royal Free Hospitals in London and completed a Ph.D. at Imperial College London, on a mechanism by which EBV promotes lymphoma development.

TOP

Dr. Dennis Enix, MBA, DC

Complementary and Alternative Medicine

Dennis Enix, MBA, DC is a musculoskeletal research scientist and former Professor of Research at Logan University in Chesterfield, USA, and a former manufacturing engineer in the aerospace and defense industry. Dr. Enix's research focuses on spinal biomechanics and anatomical research. He has taught courses in Research Methodology, Information Literacy, Anatomy and Physiology, and Clinical Methodology. Dr. Enix completed his Doctoral degree in chiropractic medicine at Logan University and a Fellowship in Rehabilitation Science at the Southern California University of Health Sciences and a Master's Degree in Business Administration from Webster University.

Dr. Enix is a member of Sigma Xi, the Scientific Honor Society, and the North American Spine Society and serves on its Research Council and Clinical Practice Guideline Committee and has co-authored several guidelines and served on several International Delphi panels. Dr. Enix is the Section Editor for complementary and alternative medicine for the Journal Medicine, and on the editorial board of the North American Spine Society journal SpineLine, and the journal Topics in Integrative Health Care and is a reviewer for multiple journals and textbooks. He has authored numerous scientific publications in The Spine Journal, Clinical Anatomy, Physical Medicine & Rehabilitation, Annals of Anatomy, Chiropractic & Manual Therapies, Journal of Chiropractic Medicine, and others and received several federal and private research grants and multiple research awards at national and international conferences.

TOP

Dr. Marcello Iriti, Ph.D.

Nutrition

Marcello Iriti has been studying nutraceuticals, functional foods, and essential oils relevant for human health, focusing on their preclinical (*in vitro*/*in vivo*) and in human pharmacological activities. He has been investigating the health-promoting effects of the traditional Mediterranean diet as well as the ethnopharmacology of herbal remedies of traditional healing systems. Dr. Iriti is a member of the Asian Council of Science Editors and Society of African Journal Editors, a founding member of the Italian Society of Environmental Medicine, a member of the Working Group 'Pharmacognosy and Phytotherapy' of the Italian Pharmacological Society. He holds the main patent for ‘Compositions Comprising Rutin Useful for the Treatment of Tumors Resistant to Chemotherapy’ (WO2015036875A1; US20160213698; US9757405B2; EP3043821).

TOP

Dr. Nikhil Jain, Ph.D.

Infectious Diseases

Nikhil Jain completed his Ph.D. in Biochemistry from the Indian Institute of Technology, Kanpur. During his postdoctoral research at Michigan State University and Baylor College of Medicine, he studied the structural basis of Ribosome biogenesis in prokaryotes. At present, he is working as a staff scientist at St. Jude Children’s Research Hospital in Memphis. He has experience in working in the diverse biomedical field including Microbial genetics, structural biology, and Biochemistry.

TOP

Dr. Sinan Kardeş, MD

Rheumatology

Sinan Kardeş is an Associate Professor at the Istanbul Faculty of Medicine. He received his Doctor of Medicine degree from Marmara School of Medicine in 2013. Dr. Kardeş completed his medical ecology and hydroclimatology residency at Istanbul Faculty of Medicine and he completed his residency training in 2017.

Dr. Kardeş is a member of the International Society of Medical Hydrology and Climatology (ISMH), International Society of Biometeorology (ISB), Society of Medical Ecology, and Hydroclimatology Specialists (SMEHS), Turkish Society of Spa Medicine and Balneology, and Turkish League Against Rheumatism (TLAR). He has research interests

in rheumatic and musculoskeletal diseases, exercise, balneotherapy, and randomized controlled trials.

TOP

Dr. Neeraj Lalwani, MD, DABR, FSAR

Radiology

Neeraj Lalwani is an American Board-Certified radiologist working as an Associate Professor of Radiology at VCU School of Medicine, as well as a consultant in the Department of Radiology at VCU Health, Richmond, Virginia. Before joining VCU, he was an Associate Professor of Radiology at Wake Forest University, North Carolina, and Assistant Professor of Radiology and director of Gastrointestinal Imaging at the University of Washington, Seattle.

Born in India, Dr. Lalwani has completed his Abdominal Imaging and Body MRI Fellowships at the University of Texas Health Sciences Centre, San Antonio. He is a recognized and passionate educator in radiology who has a particular interest in pelvic MRI, oncology, gastrointestinal and hepatobiliary imaging.

Dr. Lalwani is an established academician and researcher in radiology and has received the most coveted American Roentgen Ray Society's Figley Fellowship award (2019) and the Radiological Society of North America's Honored Educator award (2020). He has published numerous papers in highly influential journals and has presented numerous invited talks, oral presentations, and educational exhibits at national and international conferences, and won numerous prestigious accolades.

TOP

Dr. Yan Li, MD

Immunology

Surgery

Yan Li worked as a Staff and Research Leader in Colorectal Surgery of Digestive Disease and Surgery Institute in Cleveland Clinic and Assistant Professor in the School of Medicine at Case Western Reserve University in Cleveland, Ohio. He is a resourceful and dedicated medical professional, investigator, and educator in the domain of Medicine, Immunotherapy, Oncology therapy, and Regenerative medicine with 20 years of cumulative direct and indirect patient care as well as 15 years of progressive Clinical and Translational research experiences.

Dr. Li was presented with the Keith Rainin Foundation Synergy Award. He attributes his

professional successes to his openness to collaborations. He maintains his professional affiliation with the American Professional Immunologists and the American Heart Association.

TOP

Professor Dan Lipsker, MD

Dermatology

Dan Lipsker is Professor of Dermatology at the University of Strasbourg, France and he works as Dermatologists in the Clinique Dermatologique des Hôpitaux Universitaires de Strasbourg. He is interested in the whole spectrum of clinical dermatology and dermatopathology. He has senior editing activities in dermatology and internal medicine Journals and has written and/or edited numerous books, among which the major French Textbook of Dermatology and the leading textbook on Clinical Examination and diagnosis in Dermatology. He has worked and published in many fields, and his main interests include diagnostic reasoning and morphologic approach to skin diseases, skin manifestations of internal diseases, autoinflammatory diseases and the Schnitzler syndrome, connective tissue diseases, Lyme borreliosis, and melanoma epidemiology.

TOP

Dr. Giuseppe Lucarelli, MD, Ph.D.

Urology

Giuseppe Lucarelli currently works as Assistant Professor of Urology at the Department of Emergency and Organ Transplantation, University of Bari (Italy). Dr. Lucarelli is a clinician-scientist, urologist, and transplant surgeon, and his primary research interests are in urologic oncology and kidney transplantation. Dr. Lucarelli has served as an author on over 200 publications.

TOP

Dr. Gaurav Malhotra, MBBS, DRM, DNB

Endocrinology

Gaurav Malhotra is a National Board Certified Nuclear Medicine Physician and Professor of Nuclear Medicine at Homi Bhaba National Institute of the Department of Atomic Energy in India. For the last two decades, he has been working at the Radiation Medicine Centre of Bhabha Atomic Research Centre, where he has been managing thyroid clinics, diagnostic nuclear medicine scans, and targeted therapies. He is a National Medical Council recognized postgraduate teacher, thesis guide, examiner, and assessor for MD nuclear medicine courses in India. He has numerous publications and book chapters in preferred journals and

serves on the editorial board of Clinical Nuclear Medicine journal of the USA. His special interests and ongoing clinical research are focused on thyroid disorders, adrenal tumors including paragangliomas, pituitary tumors, other endocrine malignancies, ectopic Cushing's syndromes, and oncogenic osteomalacia.

TOP

Dr. Antonio Palazón-Bru, Ph.D.

Cardiovascular

Epidemiology

Prof. Palazón-Bru received his undergraduate and master's degree in Mathematics from the University of Alicante (Spain), and in Statistics from the Miguel Hernández University (Spain); and his master's degree in Public Health from the Miguel Hernández University. After that, he obtained his Ph.D. in Clinical Research from the Miguel Hernández University and in Applied Mathematics from the University of Alicante. He joined the Department of Clinical Medicine at the Miguel Hernández University in 2016, and he has taught in the undergraduate and master degree and doctorate programs. His research has focused on predictive models, public health, cardiovascular risk, clinical research methodology, systematic reviews, and clinical trials. He serves as an Academic Editor for Medicine, PLoS One, and PeerJ, and he has placed in the top 1% of reviewers on Publons global reviewer database from 2017 to 2019.

TOP

Dr. Parag Parekh, Ph.D.

Diagnostic Medicine and Pathology

Parag Parekh received his Ph.D. in Chemistry from the University of Florida at Gainesville. He trained at the interface of the two disciplines as a Chemical Biologist and a Bioanalytical Chemist with a particular focus on generating aptamer probes for varied applications. He was a postdoctoral fellow at the Department of Pathology and Genomic Medicine at Houston Methodist Research Institute and later joined as Research Scientist at the Department of Endocrine Neoplasia and Hormonal Disorders at the MD Anderson Cancer Center. Subsequently, he joined the Baylor College of Medicine/Texas Children's Hospital as a Senior Research Scientist in 2019. Dr. Parekh joined *Medicine* in 2016 and handles papers related to Diagnostic Medicine and Pathology.

TOP

Professor Davor Plavec, MD, MSc, Ph.D

Pulmonology

Davor Plavec leads Research Department at Srebrnjak Children's Hospital. His professional training consisted of Specialist training in Occupational Medicine (Institute for Medical Research and Occupational Health, Zagreb, 2001-04) and successive appointments at the same institution as Senior Scientist and Research Director, and

Specialist (2004-05). During the preceding period, he was awarded M.D. (1987), M.Sc. (1991), and Ph.D. (1999) at the Medical School University of Zagreb. After completing his clinical specialist training, he was promoted to the position of Assist. Professor in 2009, which was followed by an Assoc.Professor in 2014 and Full Professor position at the Medical School University JJ Strossmayer, Osijek, Croatia. He is also teaching at several other faculties in Croatia. He also finished Specialist training in Sports Medicine (2011-13).

His research has focused upon the origins and natural history of asthma and allergy across the life-course, with an emphasis on prevention and translation for patient benefit. His research findings are of great practical significance and have informed and changed national and international guidelines on asthma prevention and management. His studies in food allergy substantially impacted clinical practice. His discovery that IgE-response to peanut allergen Ara h 2 is much more predictive of true peanut allergy than standard tests using whole allergen extract marked the start of the component-resolved diagnostics as the new gold standard in clinical practice.

Of merit is his recent pioneering research in the emerging field of biomarkers of diagnosis and control of asthma and COPD: the role of urates in exhaled breath condensate, fractional exhaled breath temperature, and non-invasive lung function diagnostics in small children. His research was funded by several EU (FP6, FP7, HORIZON 2020), national and investigator-initiated grants. He published > 250 publications (> 120 in WoS) with > 2000 citations.

He served for several terms as a Board Member of several professional societies (Croatian Respiratory Society, Croatian Society for Allergy and Clinical Immunology, Croatian Society for Sports Medicine, Croatian Toxicology Society) and is a member of EAACI and ERS.

From 2000-2008 he was acting as Managing Editor of the Croatian edition of JAMA. Acting as Academic editor in Medicine Journal (from 2018) and PLOS ONE Journal (from 2018). He is acting as a reviewer for >20 peer review journals, being rewarded the Top reviewer award by Publons (WoS) in Clinical Medicine and Cross-Field for 2018 and 2019.

TOP

Dr. Christine Pocha, MD, Ph.D., MPH, FAASLD

Gastroenterology and Hepatology

Christine Pocha, MD is a board-certified gastroenterologist and transplant hepatologist at Avera Liver Center & Transplant Institute. She holds an appointment as Associate Professor of Medicine at the University of South Dakota. Dr. Pocha completed a Ph.D. in Clinical Pharmacology and an MPH in Clinical Epidemiology at the University of Massachusetts. Her main research and clinic interests include alcoholic and non-alcoholic liver disease, complications of cirrhosis, and hepatocellular cancer. She has presented at national and international meetings and published extensively. She has spearheaded many clinical trials particularly on liver cancer as well as large epidemiology studies. Dr. Pocha earned her medical degree from Friedrich-Schiller-University in Jena, Germany. She completed a residency in internal medicine, subspecialty training in gastroenterology and hepatology including liver transplant at the same university. After further residency training in the U.S. Dr. Pocha has worked at liver transplant centers in the U.S., Germany, and Switzerland. She proudly holds privileges as Honorary Consultant at the Department of Hepatology at King's College in London and goes there as often as time allows. In 2016, she accepted the position as Director of Hepatology and Medical Director of Liver Transplant at Avera. Dr. Pocha was awarded a fellowship to the American Association of the Study of

Liver Disease (AASLD). She serves as a chair of the scientific review committee and board member of educational subcommittees for AASLD. She is a member of the European Association for the Study of the Liver (EASL) as well as a primary reviewer at the UNOS National Liver Review Board. She serves on the editorial board as well as an expert reviewer for many GI/Hepatology journals.

TOP

Dr. Khaled Saad, MSc, Ph.D.

Pediatrics

Khaled Saad graduated from Assiut University's programs in Medicine and Surgery in 1997, and he obtained a master's degree (MSc) in Pediatrics in 2003. After that, he joined the Pediatrics Department, at Assiut University, as a staff member teaching pediatrics for medical students and postgraduates. In 2009, he received a Ph.D. degree in clinical pediatrics. He is a professor in the Pediatrics and pediatric neurology, Department at the Assiut University Children's Hospital, the largest pediatric medical center in Upper Egypt, a teaching hospital with more than 550 beds that provides primary and tertiary care for children in all governorates in Upper Egypt. He has a considerable number of international publications (82 publications) plus three book chapters. Prof. Khaled is a section academic editor in 5 journals and an editorial board member of 48 international medical journals in the fields of pediatrics and general medicine. He is a referee in 150 international medical journals.

TOP

Prof. Dr. rer. nat. Oliver Schildgen

Infectious Diseases

Oliver Schildgen received his Dr. rer. nat. (Ph.D.) from the University of Essen. He currently serves as the Head of Molecular Pathology Unit in the Institute of Pathology, Hospital of the Private University Witten/Herdecke. Prof. Dr. Schildgen has authored 190 publications. His primary field of research is medical virology.

Prof. Dr. Schildgen is a member of several scientific societies including the German Society for Virology, the European Society for Clinical Virology, the Paul Ehrlich Gesellschaft für Chemotherapie, and Microbiology Society, UK. Prof. Dr. Schildgen has received several prestigious awards and nominations such as the Medizin-Management Award, the Wolfgang-Stille-Award of the Paul-Ehrlich-Society (P.E.G.) for Chemotherapy, International Abbott Diagnostic Award of the European Society for Clinical Virology, International Meteka-Award of the Austrian Society for Microbiology (ÖGHMP), and more. Prof. Dr. Schildgen has also presented as a keynote lecturer at many conferences including but not limited to the Medical Physiology 2010 conference, Cambridge, UK, the WHO sponsored International Symposium on Viral respiratory disease Surveillance, and the International Symposium on HIV and Emerging Infectious Diseases.

In addition to serving as Section Editor of Infectious Diseases for *Medicine*, Prof. Dr. Schildgen currently serves as the Editor-in-Chief of Reviews in *Medical Microbiology* and as an Academic Editor for *Expert Review of Molecular Diagnostics, Cancers*, and *PloS One*. He also served as an Expert Evaluator for numerous councils and foundations such as the French National Research Agency (ANR), the Polish Research Council, the Belgian Ministry of Health,

and more.

TOP

Dr. Dominik Steubl, MD

Nephrology

Dominik Steubl attended medical school at the Technical University Munich, Germany from 2003-2009. He completed his residency in internal medicine and nephrology at Hospital Rechts der Isar, Technical University Munich and affiliated hospitals, Germany 2010-2016. He completed research as a postdoc in the Division of Nephrology at Tufts Medical Center from 2017-2018. He is currently serving as a nephrology attending and a faculty member in the Division of Nephrology at Technical University Munich, Germany with a clinical focus on peritoneal dialysis and transplantation immunology.

TOP

Dr. Wen-Wei Sung, MD, Ph.D.

Surgery

Urology

Wen-Wei Sung completed M.D.-Ph.D. program training at Chung Shan Medical University in 2016, followed by one-year post-graduate year training. Afterward, he works in the Chung Shan Medical University and the Hospital as a resident of the Department of Urology and an Assistant Professor at the Chung Shan School of Medicine. His research focuses on oncoimmunology in the aspects of tumor progression and precision medicine. He also interests in the prognostic markers in types of cancer. He is the principal investigator of projects exploring personalized therapeutic strategies via primary cancer cells and in vivo models in urogenital and gastrointestinal cancers. He also serves as the editor (PLOS ONE; Medicine; World Journal of Gastrointestinal Oncology, WJGO) and the reviewer for more than forty journals.

TOP

Dr. Giovanni Tarantino, MD

Metabolic Disorders

Giovanni Tarantino received his MD with distinction from Federico II University of Naples School of Medicine in 1970. He received his specialization in Endocrinology and Metabolic Diseases in 1974 and Internal Medicine in 1980. Dr. Tarantino completed his residency at Federico II University School of Medicine Hospital of Naples and later served

as a consultant in Hepatology, as a research fellow, a principal clinical investigator in Hepatology, and an adjunct professor of Internal Medicine. Dr. Tarantino also served as Chief of the Hepatology in Internal Medicine and the Director of Investigative and Non-invasive Laboratory of Hepatic Hemodynamics and Ultrasonography of the Federico II School of Medicine Hospital of Naples. He was also the Coordinator at the Specialization School of Internal Medicine of the Federico II University Medical School.

After retiring from his professorship, Dr. Tarantino now serves as a consultant for the Internal Medicine team and a clinical investigator in the field of Hepatology and Clinical Medicine. Dr. Tarantino also serves as an editor for several medical journals including *Advances in Therapy, Medicina, Current Medicinal Chemistry, Frontiers in Medicine, BMC Pharmacology*, and more. Dr. Tarantino has published nearly 200 papers in peer-reviewed international journals and several chapters for books. His area of expertise includes non-alcoholic fatty liver disease, metabolic syndrome, obesity, atherosclerosis, PCOS, HCV-related chronic hepatitis, HCV-related arthritis, therapy of liver cirrhosis, portal hypertension, hepatic encephalopathy, imaging-ultrasonography of liver and spleen, psoriatic arthritis, and inflammation.

TOP

Dr. LW Zheng, DDS, MD, Ph.D.

Oral Medicine

LW Zheng is a clinical associate professor in Oral Medicine in the Division of Oral & Maxillofacial Surgery, Faculty of Dentistry, The University of Hong Kong. Dr. Zheng's research interests include compromised tissue healing/regeneration in the oral and maxillofacial region, as well as oral cancer and pre-cancer conditions. Dr. Zheng published two books, two dissertations, seven book chapters, and over 80 peer-reviewed journal articles.

TOP

Dr. Qinhong Zhang, Ph.D., MD

Neurology

Complementary and Alternative Medicine

Qinhong Zhang is an associate professor of Acupuncture and Moxibustion College of Heilongjiang University and a research scholar at the Stanford University School of Medicine.

Dr. Zhang was elected to join the Outstanding Innovative Talent Plan of both Heilongjiang Province and the Heilongjiang University of Chinese Medicine. He hosted and participated in 13 research projects, including national, provincial, and ministerial levels. Among them, Dr. Zhang hosted one project for the National Natural Science Foundation (Youth Scholar Fund), two projects for the Heilongjiang Provincial Department of Education, and two projects for the Heilongjiang University of Chinese Medicine. He has published three books and 65 research papers in more than 20 prominent international articles. Dr. Zhang won two awards at the ministerial level and one national invention patent.

Dr. Zhang's professional fields of interest include headache, migraine, frozen shoulder, tennis elbow, neck pain, Whiplash, lower back pain, knees pain, sciatica, etc., stroke rehabilitation (all weakness, paralysis, pain, emotional, urinary, and bowel disorders), brain and spinal cord injury, hearing loss, tinnitus, insomnia, stress, anxiety, depression, urinary disorder (urinary incontinence, urinary retention), and bowel disorder (constipation, bowel incontinence, irritable bowel syndrome).

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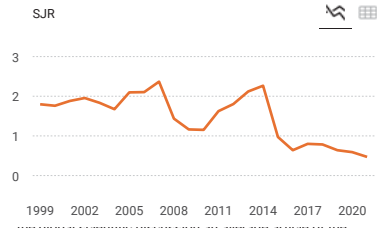

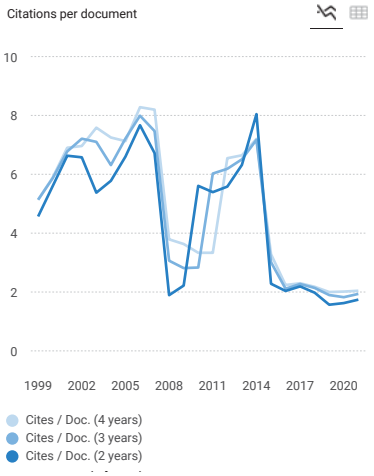

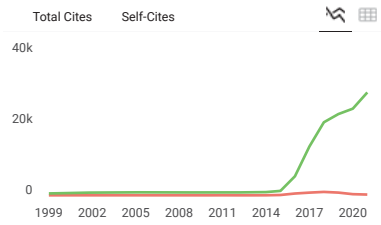

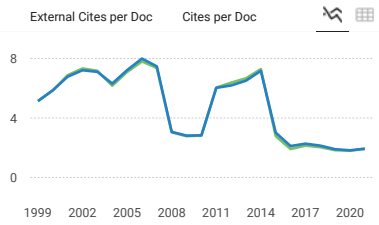

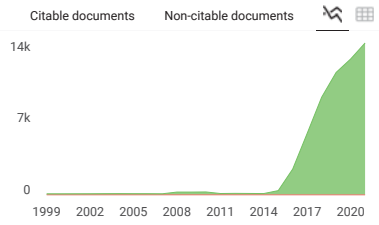

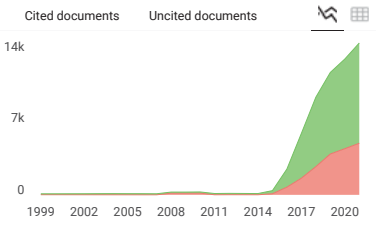

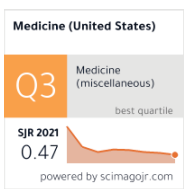

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