Metastasis of E-mail at an Academic Medical Center

For my part, I could easily do without the post-office. I think that there are very few important communications made through it. To speak critically, I never received more than one or two letters in my life...that were worth the postage.

Henry David Thoreau, Walden

Communication modalities have dramatically changed since Thoreau’s time, and one can imagine how he would regard Twitter. Today, instantaneous communication through electronic mail (e-mail) can be sent for free to an infinite number of recipients with a mouse click. This capability has clear benefits (speed, ease of use, and global reach), yet unintended consequences exist for this convenience.1,2,3

At academic medical centers, e-mail provides a simple way to communicate and serve the multiple missions of these complex organizations. Less obvious is how e-mail contributes to a daunting volume of information, flooding employees with information frequently irrelevant to their responsibilities. To call attention to some unintended effects of “cost-free” communication, we quantified the volume and described the content of mass distribution e-mails sent to a single physician (I.M.P.) over 1 year and estimated the economic impact of a physician reading these messages.

To accomplish these goals, mass distribution e-mails sent from the department level or higher were compiled during the 2009-2010 academic year and categorized by source and content. Administrative data (number of physicians and mean salary) were obtained, and cost estimates were generated using conservative estimates of a 50-hour workweek throughout the year.

Over 12 months, 2035 mass distribution e-mails were received: 1501 (73.8%) from the medical center level, 450 (22.1%) from the department, and 84 (4.1%) from the university. Medical center e-mails most frequently related to information technology (360; 24.0%), academic/professional development issues (332; 22.1%), and social events/opportunities (285; 19.0%), while e-mails related to clinical care, research, or education combined to total 451 (30.0%). Of 450 department e-mails, 169 (37.6%) were related to academic/professional development, 117 (26.0%) concerned education, and 87 (19.3%) were social in nature.

If 30 seconds were spent per e-mail, the annual cost per physician to read these mass distribution e-mails was $1641 (mean 2009-2010 salary = $231 612). If 90 seconds were spent per e-mail, the cost was $4923 per physician. With 629 employed physicians, the annual institutional cost was between $1 029 419 and $3 088 257 for physicians to read mass distribution e-mails.

These data suggest that mass distribution e-mails at academic medical centers are frequent and costly. Though generalizability is limited by several obvious factors, this problem is pervasive in academic medicine and other industries.4 A 1993 report suggested e-mail made physicians’ lives easier and had a humanizing influence,5 but physicians are now flooded with unfiltered, untargeted e-mails that distract from “real work.” Compounding this overload are messages with errors requiring corrections, failure to consolidate information, and failure to highlight crucial information. The cumulative effect is reduced productivity, wasted time, and potentially a diminished quality of life.2

Several remedies are readily available: (1) consolidate non-urgent emails from one source; (2) use internal web-based messages or calendars; (3) create list-serves for targeted audiences (with opt-out options); (4) enable spam filters to internal e-mails; (5) incentivize individuals to consider appropriateness and accuracy when sending messages to “all recipients”; and (6) limit reminder messages.

The risk that important information might not reach every intended recipient must be balanced against not only the cost of our current metastatic e-mail culture, but also “e-mail fatigue” that can undermine effective communication. E-mail undoubtedly serves vital purposes in professionals’ lives, but much e-mail falls into the same category of “so-called comforts of life” that Thoreau described as not only dispensable, but “positive hindrances to the elevation of mankind.”1

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Market Analysis of Vitamin Supplementation in Infants and Children: Evidence From the Dietary Supplement Label Database

The Office of Dietary Supplements in concert with the National Library of Medicine recently created the Dietary Supplement Label Database (DSLD) to facilitate the scientific study of dietary supplement labels.1,2 The DSLD allows researchers to extract dietary supplement labels for research purposes. For example, the database may be used to assess label information to ensure that label information is truthful and accurate or to compare and contrast a large number of dietary supplements.

To our knowledge, we report the first analysis of labeled vitamin content for infants and children (<12 months and 12 months to <4 years) through the use of the DSLD. We analyzed whether the content of vitamins as a whole is based on Institute of Medicine (IOM) recommendations.3

Methods | The initial data sets were downloaded July 7, 2013, from the DSLD after using the advanced search option to select for 2 intended user groups, younger than 12 months and 12 months to younger than 4 years. Each dietary supplement label was separated by vitamin into separate spreadsheets and analyzed. In the younger than 12 months group, 21 labels were downloaded and analyzed. Three shown to contain a dietary supplement intended for infants younger than 12 months were excluded. In the 12 months to younger than 4 years group, a total of 172 labels were downloaded and analyzed. Data validation including an analysis of DSLD data with scanned labels was subsequently carried out on 10% of vitamin entries in both intended user groups. Vitamin amounts were divided by the IOM-recommended daily allowance (RDA) or adequate intake (AI) values to reveal a percentage of recommended RDA/AI. The RDA/AI percentages were averaged and standard error of the mean was calculated for each vitamin. Vitamin A concentrations were calculated based on the Office of Dietary Supplements health profession fact sheet4 when the label did not indicate the vitamin A source, preformed units were assumed. The data were then plotted by intended user group (Figure).

Results | Vitamin D was the only vitamin present in the dietary supplements analyzed to contain at or below the RDA value for both pediatric intended user groups (Figure). The remaining vitamins presented in the IOM list contained values in excess of the RDA/AI values or were not present in enough vitamins (n < 3) to complete an appropriate analysis. Vitamin levels varied from a low of 13% of adequate intake for choline to a high of 936% of adequate intake for biotin (Figure, B).

Discussion | According to the IOM, infant vitamin supplementation in excess of the RDA/AI for vitamins C, E, K, B6, and B12 as well as thiamin, riboflavin, niacin, folate, pantothenic acid, biotin, choline, and carotenoids is not recommended. Similarly, in the 12 months to younger than 4 years category, vitamin supplementation in excess of RDA/AI is not recommended for vitamins K and B12 as well as thiamin, riboflavin, folate, pantothenic acid, and biotin. The recommendation against excess neonatal and pediatric supplementation is because of a “lack of data of adverse effects in this age group and concern with regard to the lack of ability to handle excess amounts. Source intake should be from food only.”5 None of the tolerable upper intake levels have been defined by the IOM for this reason. However, dietary supplements (Figure) conversely supplemented in excess of the RDA/AI for vitamins C, E, K, B6, and B12 as well as thiamin, riboflavin, niacin, folate, pantothenic acid, biotin, choline, and carotenoids resulted in intake levels in excess of the tolerable upper intake levels recommended by the IOM. It is beyond the scope of this study to determine whether the dietary supplement vitamin levels in excess of the RDA/AI values reflect an over-representation of one or more vitamins in the dietary supplement database, a lack of vitamins or vitamin combinations in the dietary supplement database, or a lack of representation of infant and child dietary supplement vitamin intakes in the dietary supplement database. To address this, the DSLD after using the advanced search option to select for 2 intended user groups, younger than 12 months and 12 months to younger than 4 years. Each dietary supplement label was separated by vitamin into separate spreadsheets and analyzed. In the younger than 12 months group, 21 labels were downloaded and analyzed. Three shown to contain a dietary supplement intended for infants younger than 12 months were excluded. In the 12 months to younger than 4 years group, a total of 172 labels were downloaded and analyzed. Data validation including an analysis of DSLD data with scanned labels was subsequently carried out on 10% of vitamin entries in both intended user groups. Vitamin amounts were divided by the IOM-recommended daily allowance (RDA) or adequate intake (AI) values to reveal a percentage of recommended RDA/AI. The RDA/AI percentages were averaged and standard error of the mean was calculated for each vitamin. Vitamin A concentrations were calculated based on the Office of Dietary Supplements health profession fact sheet4 when the label did not indicate the vitamin A source, preformed units were assumed. The data were then plotted by intended user group (Figure).

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Figure. Vitamin Levels in Dietary Supplements by Intended Pediatric User Group

Percentage of Institute of Medicine recommended daily allowances or adequate intakes of vitamins in dietary supplements marketed to infants (<1 y) (A) and toddlers (1-3 y of age) (B) plotted as the mean percentage (SEM). Mean values were not included when there were insufficient data from the Dietary Supplement Label Database.

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